IRON AGE

editorial

Guns, Butter and Pap

SINCE Charlie Wilson joined the defense effort things are moving a little faster. When he gets through shuffling people and things around they will move much faster. But there is only so much one can do. The rest is up to the people who have the responsibilities to see that things keep rolling.

It would be nice to sit back and say "Now things are going fine. Everything will be all right." But that just isn't so. Things are not fine nor are they going well. There will have to be a lot of heads bumped, personalities cut down and a stripped-for-action attitude taken before we get out of this snail's pace.

We seem to be fettered by too many words. We hear on every hand speeches about how we will keep our standard of living. Speakers high and mighty in the defense effort talk as if they would be robbing the people if we had a meatless day; or if we had less gas; or if we had to wear shiny pants; or if our wives had to turn our cuffs to get some extra wear; or if we had to read in a room that was a little below 72°.

Why all this fuss about standard of living? We are preparing for war or to prevent war so we can have a high standard of living and freedom. Is that term so sacred that we can't toss it in the ash can until we get strong and pay the bill as we go along?

We will still be living like kings compared to the rest of the world. We will live to see the day when we can prate about a television in every room, two dishwashers, hot and cold atmosphere, delicately perfumed house dust, 4-week vacations and hors d'oeuvres.

It is all right to prepare the people for things to come but we have had enough hot air on this subject from Washington to lift most of the rigid aircraft we have at present. What the people want is action. They have been ready for months. Let's tell them what they face in honest understandable terms and leave out the politicians' grandiose words that mean nothing.

Let's give the fellow, who knows the draft board will get him, some dope on how soon. Let's tell the industry that strives to keep its workers until defense orders come how long it will be. Let's tell what mistakes are being made and how they will be overcome. Let's get rid of the ones in high places who are not qualified to carry on such a big task.

In other words let's cut out some of the butter, all of the pap and concentrate on guns for a while at least.

Tom Campbell

Editor

IRON AGE *newsfront*

news methods and product forecast

► A satisfactory side joint for containers made from electrolytically aluminized steel sheet has been developed in the laboratory. The method of joining the ends of cans made from this material will not be changed from the method now used on tinplate stock. The new process is not yet in commercial production.

► Tests indicate it may be practical to use porcelain, which has uniform physical properties and great gripping power, in place of mica in insulating electrical machinery commutators. Design of stronger commutators would ease a serious problem in design of high-speed motors and generators.

► Now in commercial use is a water conditioning process using a new synthetic resin. It can produce an effluent with zero hardness, low solids, alkalininity, silica and CO_2. Also, pH is high and only inexpensive salt and lime are needed for operation.

► Infra-red heating of test tubes has been developed in Switzerland as an improvement on the bunsen burner. Heating and cooling are a great deal faster.

► Some railroads are getting a little worried about the effect of new Eastern steel mills on their freight revenues. When these mills begin producing, the freight revenue pattern will be altered drastically. Shipments from Pittsburgh to the East, for example, are likely to fall off.

► To date, investigations (by at least one major firm) of ductile silicon and alloys of this metal have been negative. Alloys tested so far have proved too brittle. This characteristic appears to be due to the fact that silicon has a diamond crystal lattice structure.

► A new aluminum alloy, 78S, will soon be announced. This heat-treatable grade is 10 pct stronger than the old type 76S.

► People who study the long-range supply outlook for steelmaking scrap must consider a new and very important factor: Steel users are constantly finding new ways to reduce scrap loss in manufacturing. The tonnage of scrap in relation to new steel used by the auto industry, for instance, is constantly being lowered by more efficient manufacturing methods.

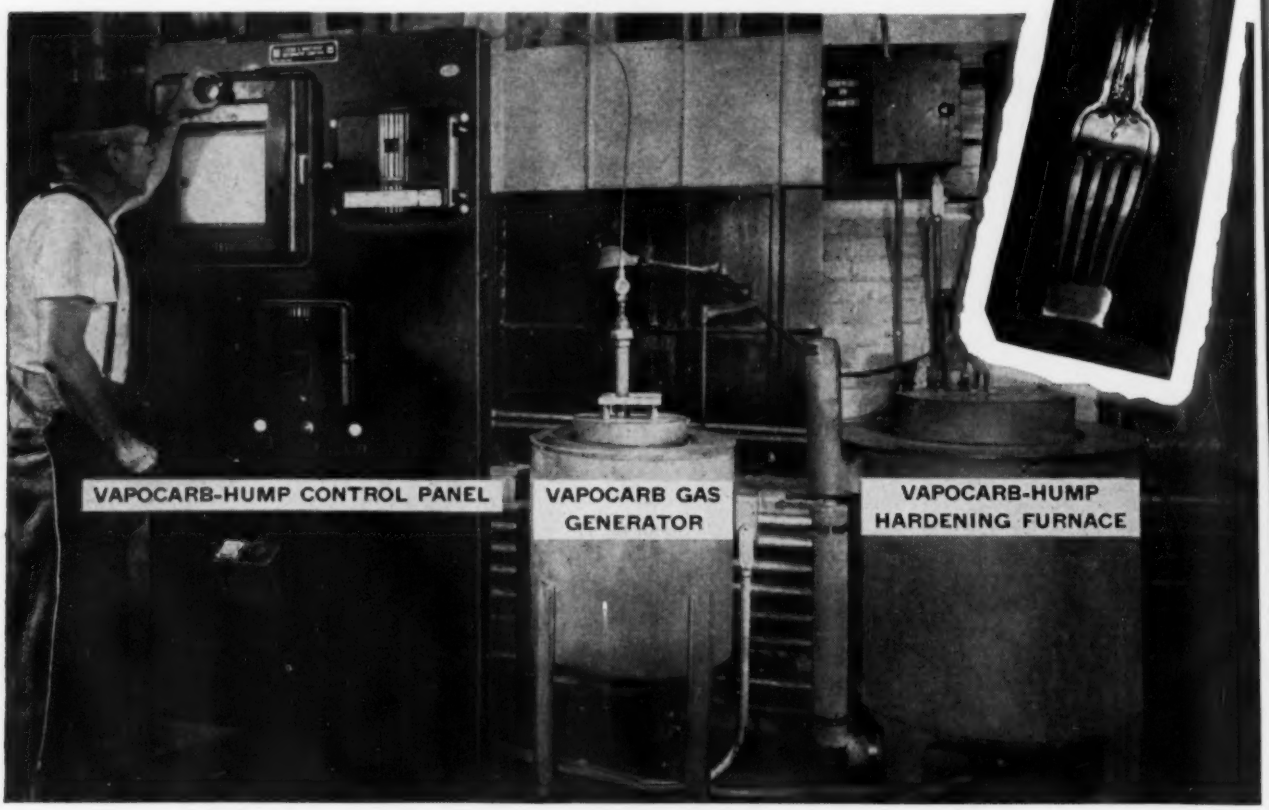
► The furore over lack of priorities for steel capacity expansion is still unheeded. But at least as serious and so far unnoticed is the lack of priorities on steel for maintenance and repair of existing steelmaking facilities.

► Hot-dipped aluminum coatings of steel fence have proved exceptionally satisfactory. Tests conducted so far by one aluminum manufacturer indicate that it will definitely be competitive with the galvanized product.

► Disliking the behavior of airplanes in atmospheric bumps, a French engineer designed an articulated wing plane which was flown this month. He uses the automotive shock absorber principle to control the "flexible" wings.

Silversmith's Way of Improving Tools Gives More Production Per Tool Dollar

Photos courtesy Towle Manufacturing Co., makers of sterling silver knives, forks, spoons and other tableware. Fork die shown is the King Richard Pattern.



Read About COST-CUTTING PROCESSES In These Catalogs

We supply complete Furnace Processes to regulate all action inside the heat-treating furnace, for hardening, tempering, normalizing, carburizing, nitriding, steam-treatment, dry cyaniding. See us if you want heavy production at low cost!

Address nearest office, or 4956 Stenton Ave., Phila. 44, Pa.

Jrl. Ad T-620(32)

TOWLE Manufacturing Company is one of the firms which successfully lengthens the production life of its forging dies. And Towle's method is basically "right" for other metal-working firms, whether they use expensive tools or simple ones, because Towle is interested in heavy production . . . the last possible piece from every die.

Towle's plan starts with the usual printed form for each die, on which are entered the heat-treating temperature, time, quench, hardness, etc., and the production from the tool, so that when it is retired the company can tell whether or not it produced well.

So far, of course, many plants use this routine; but Towle adds a "pay-off" step—they never throw a sheet away, regardless of the yield from its die. The sheet becomes a guide as to whether succeeding tools should be used differently, or made of a different steel, or heat-treated differently.

As far as heat-treatment is concerned, the pay-off lies in Towle's facilities for either reproducing or changing the treatment, as they wish. Their Vapocarb-Hump Hardening and Homo Tempering equipments do exactly as the heat-treater says. With them, he can secure the desired structure, hardness and temper, just as a toolmaker can set the feed and speed of a filing machine. Guesswork is ended; the heat-treat becomes a place where specifications are followed to the letter.

Reasons for the dependability of these L&N Methods are given in the Catalogs at left; they explain why more and more plants are finding that it pays to Vapocarb-Hump Harden and Homo Temper all tools.

LEEDS NORTHRUP

IRON AGE *summary*

iron and steel industry trends

Price Controls and CMP Being Readied
Lack of Staff Seen Biggest Obstacle
Paper Work Snows Steel Sales Staffs

PRICE controls and a controlled materials plan are being readied in Washington this week. A general price freeze covering nearly all products and commodities will become effective about February 15. The CMP will be in effect by June, if not sooner.

Both of these anti-inflation weapons will be hampered in their early stages by a dire shortage of administrative people, but the cries for heavy artillery against inflation have become so frequent and so loud that the Government can no longer resist them.

Increasing labor and material costs are upsetting expansion and improvement plans of some manufacturing companies. They are finding money allotted to these projects in the planning stage is no longer sufficient to cover requirements when construction is ready to start. One company's estimate for custom made capital equipment was over 100 pct off.

Shifting DO Pattern Confuses Producers

Snowballing government orders, regulations, directives, revisions, and amendments have caused some people in industry who dislike government controls to call for a controlled materials plan. Steel producers are in a dither, trying to meet the constantly shifting needs of defense and essential civilian programs and still tell their regular customers what to expect. This everchanging pattern of DO and government-directed tonnage has upset their production schedules to the point where they are about ready to throw up their hands in disgust.

In addition, mills' clerical staffs are buried under mountains of paper work. For example, steel tonnage set aside for DO orders is based on shipments during a base period last year; government program tonnage is allocated directly; and warehouse allocations are based on another set of conditions. Just when clerical forces start to work their way clear, additional directives, new programs, or changed percentages, snow them under again.

While steel people feel that CMP is necessary to restore order to the confused market, they also fear it. Once the economy is controlled to this extent it will be hard to get the controls lifted. They fear that CMP will drag on like a millstone long after the emergency or war has passed.

Hard to Check Urgency of DO Orders

Meanwhile, military secrecy on the end use of alloy steel products is making it difficult for producers to check on the urgency of DO orders. They have no way of knowing whether a consumer is overstating the need for prompt delivery because ordnance applications are under wraps. They must take the word of the consumer.

Defense orders for stainless steel, particularly sheets, are growing by leaps and bounds. One producer who shipped 41 pct of his stainless sheets on DO orders in December has projected his February delivery to 55 pct and March delivery to 68 pct.

Defense tooling is now putting plenty of pressure on the machine tool market. It is becoming almost impossible to buy a standard machine today without a priority. Military people are insisting on standard machines wherever possible. In many cases they have the authority to buy standard equipment on the spot without consulting Washington. Also some new plants are expected to be kept in standby condition after the crisis. Standard machines are desirable from that standpoint too.

Steelmaking operations this week are scheduled at 101 pct of rated capacity, up 1½ points from last week. This will be another new all-time record for steel produced in a single week.

(nonferrous summary, p 94)

SAVES $5,000 YEARLY ON STEEL COST

Unloading Time Cut 2 Hours Per Railroad Car

5-ton, 3-runway, 50-ft. span, completely motorized Cleveland Tramrail bridge operated by pushbuttons from floor. Bridge is shown interlocked with track extending out doorway over railroad. This Tramrail system has been in service since 1943.

A handsome dividend is being earned by the Kortick Manufacturing Co., San Francisco, Calif., on its Tramrail transfer bridge installation.

Because the bridge is of 5 tons capacity, the rods, bars and angle iron which Kortick uses for the manufacture of pole line hardware, can be bought and handled in 5-ton bundles. This eliminates a bundling charge made for smaller bundles. The savings is $2.00 per ton. As Kortick takes in an average of 200 tons per month, the monthly saving amounts to $400.

The bridge interlocks with an outside Tramrail track that extends over a railroad track. This enables the hoist carrier to deliver steel directly from railroad cars to any point inside the building served by the bridge. Because of this feature and the fact that heavier bundles are handled, a saving of about 2 hours unloading time is made per 50-ton car of steel, over their former method which employed a 3-ton hoist.

Obviously with total savings running in the neighborhood of $5,000 yearly, it did not take long for this Tramrail installation to pay for itself.

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CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
4861 EAST 284TH ST. WICKLIFFE, OHIO.

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Better lubrication, lower maintenance costs for roll neck bearings —

Gulf XXX Lubricant

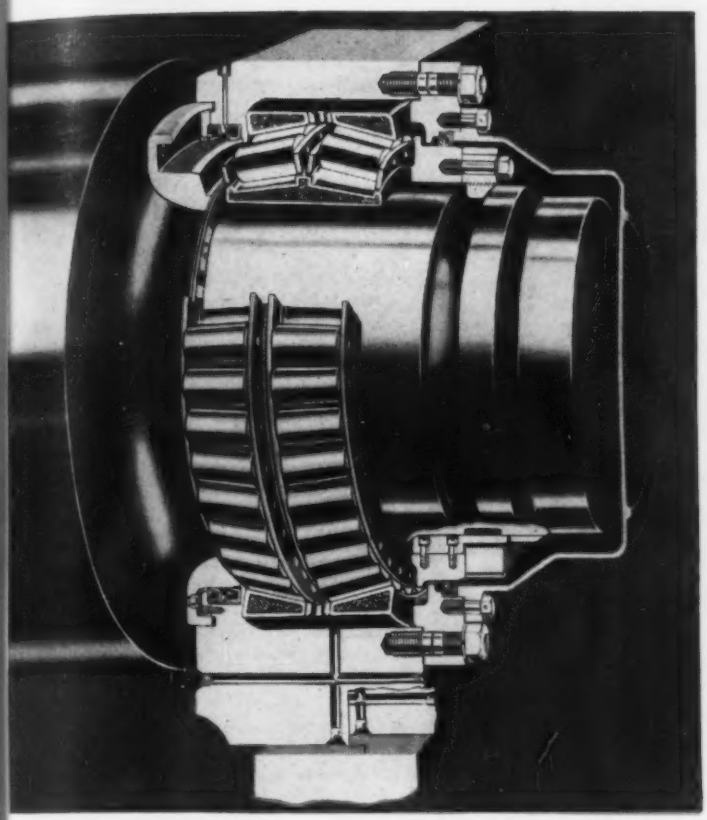


Photo courtesy The Timken Roller Bearing Company.

- X Exceptional extreme pressure characteristics
- X High resistance to washout
- X Effective protection against corrosion
- X Good stability
- X High pumpability

Gulf XXX Lubricant provides the kind of lubrication that insures long life and low maintenance costs for roll neck roller bearings. Here's why! Gulf XXX Lubricant is a high quality grease that has exceptionally good extreme pressure characteristics—protects rollers and races subjected to shock loads or overloads. It provides that extra margin of protection so often required in rolling mill service.

Gulf XXX Lubricant stays put—is not washed out of the bearing, even when subjected to the washing action of large quantities of water. Thus bearings get continuous protection and grease consumption is kept to a minimum.

Another advantage of Gulf XXX Lubricant under wet conditions is its excellent rust-preventive characteristics — it covers every roller and raceway with a film that protects highly polished surfaces. You will eliminate bearing failures from this cause when Gulf XXX Lubricant is in use.

Then, too, Gulf XXX Lubricant is a very stable grease—won't separate in storage or in service. It has excellent pumpability and is ideal for centralized lubricating systems.

For further information on Gulf XXX Lubricant and other Gulf quality lubricants for steel mills, call in a Gulf Lubrication Engineer today. Write, wire, or phone your nearest Gulf office. Gulf Oil Corporation · Gulf Refining Company, Gulf Building, Pittsburgh, Pennsylvania.

FIFTY YEARS OF SERVICE
1901 GULF 1951
PETROLEUM AND ITS PRODUCTS

Dear EDITOR

Letters From Readers

From Way Back When

Sir:

I am enclosing a very interesting document [shown below] which my father, Herbert L. Kelley, of Boston, found in the files of a Boston importing company (Silas Peirce & Co.), showing a receipted bill for a shipment of steel received from England just 100 years ago. It seems to me that prices were, surprisingly, not too far below our levels of the 30's.

R. C. KELLEY
Director of Purchases
Dresser Industries, Inc.
Cleveland

Big Investment

Sir:

Can you put us in touch with some concern which has solved a heating problem similar to ours? For the past 50 years we have heated our factory with individual stoves. It is now proposed to build a boiler room and heat the plant by steam. This will require an investment equivalent to about 40 pct of our present net worth. Will it pay?

Productive efficiency would undoubtedly be increased, but we are unable to form any definite estimate of the value of such an increase, or to determine how long it would take to recover the investment. Possibly other companies have installed similar heating plants and could give us the benefit of their experience, and help us form an estimate of the probable return from the investment.

C. H. WETZEL
President
Wayne Iron Works
Wayne, Pa.

How about it, readers; any information on a similar problem?—Ed.

Needs Tool Info

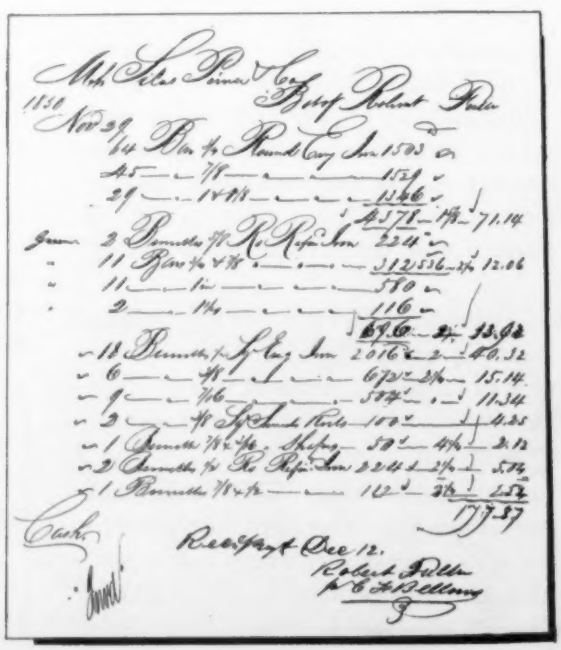
Sir:

As professor of industrial engineering at Illinois Institute of Technology, I am currently preparing and offering a course entitled Tool Engineering Economics. This course covers not only manufacturing processes in general but also, as the name implies, specific machines and the tooling of those machines.

In order to acquaint my students with the machines and tools that are available in the current market, I need specific information. You can be of great help to me in this matter by sending to me any of the following materials, or others that you might choose: Advertising brochures; catalogs; illustrative diagrams and photographs; orientation and training manuals; manuals of tooling and recommended tooling; and price lists and other related material. At the moment I am compiling a series of mimeographed notes for use in this course and eventually expect to develop a published textbook which will involve illustrations of appropriate machines and their tooling.

H. A. WILLIAMS
Illinois Institute of Technology
Chicago

Perhaps some of our readers can help Prof. Williams by supplying any of the information requested.—Ed.



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from Union Drawn's Improved

MACHINABILITY

For years, *steel parts quality has been going up . . . unit costs coming down.*

That, in a few words, is what has resulted from *a continuous improvement* in Republic Union Cold Drawn Steel Bars. That is what you can learn for yourself by using these bars on production runs of duplicate steel parts on an automatic screw machine.

In every Union Drawn mill and laboratory, it's a 60-year-old tradition that MACHINABILITY comes first. As a result, many improvements have been and still are being made in Union Free Cut (B-1112), Union Supercut (B-1113) and their companion carbon, alloy and stainless steel grades.

Today, Union Drawn customers have learned to expect a high uniformity throughout bar after bar and shipment after shipment . . . and that one lot will machine just as readily as any other lot. They expect freedom from abrasive elements and long tool life. They expect smooth, bright machined surfaces. They expect high production efficiency and low unit costs for their steel parts.

They've learned to expect all these things, because they've been getting them for years.

The same experienced metallurgists and engineers who have been spending their time in customers' plants making certain that they get best possible results from Republic Union Cold Drawn Steel Bars are ready to help you, too. Call your nearest Republic District Sales Office or write us.

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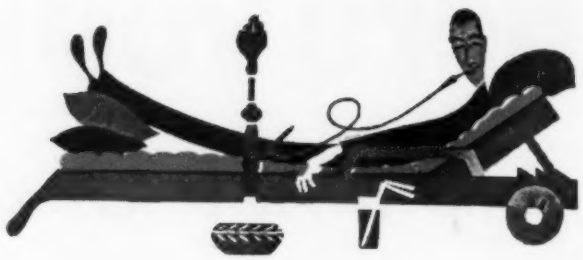


Fatigue Cracks

by Charles T. Post

Six Tricks to the Book

Just when we had become thoroughly discouraged about the possibility of reconciling widely divergent points of view in the world, we stumbled across a research project that lends new hope.

One of the country's best known research institutes is currently engrossed in a project for which the fee is being paid jointly by a Bible publisher and—of all things—a playing card manufacturer. In all the years Bibles have been printed, a certain process has been the same, untouched by the machine age. And highly mechanized as playing card manufacture is, a similar process has always been carried on by hand. Both sides finally recognized the joint nature of the problem, turned it over to the researchers under a flag of truce. Science, we are glad to report, is about to chalk up a complete triumph.

If parsons and poker players can be brought together under the aegis of science, perhaps there's a wee ray of hope for such minor matters as international differences.

Sell Research

From Armour Institute, we learn that science has taken still another step forward in its constant striving to create better things for better living.

Armour always has thrown itself wholeheartedly into everything it does and we can imagine that the entire staff and the formidable technical facilities of the Institute were engaged for months in giving birth to the latest boon to mankind—and we include advertisers under that heading.

Any day now you'll be encountering the new triumph—an electrical advertising sign that flashes on when a prospect approaches. Only thing that puzzles us is how the sign tells a prospect from a street cleaner. Possibly a built-in Dun's rating book.

Frustration

Clem Caditz wires from Snake Creek, Fla.:

BITTERLY DISAPPOINTED. CAUGHT A 63 POUND AMBERJACK BUT IT WASN'T EIGHTEEN OR TWENTY GAUGE. IT WAS ONLY FISH. LEAVING FOR HOME.

Puzzlers

The puzzler in the Jan. 11 issue has created quite a stir. Apparently everybody finally realized that the two diagonals of a rectangle are always equal. The obvious answer of 15 in. has been received from Jeanette Knapp, Chicago; Howard Fancher, Northville, N. Y.; B. L. Obear, Dexter, Maine; G. L. Griffith, Wright Aeronautical Corp.; Robert Huff, Canton, Ohio; and Nora LaDow, Birmingham.

A late comer on the smoke stack problem is Paul Bergevin, The Torrington Co., Ltd. His answer of 3.064 ft is good enough for us.

This week's puzzler sent in by Robert Huff, Canton, Ohio, is a good workout in plane geometry—with no tricks. A hole 4 in. in diameter is drilled through a metal block. Inserted in this hole are two roller bearings with the same length as the hole and radii of 1½ and ½ respectively. What is the radius of the largest ball bearing which can be thrust through the assembly?

machine tool high spots

sales inquiries and production

by W.A.Lloyd

Defense Inflates Demand—Demand for machine tools was threatening to reach sky-high proportions this week as some of the primary objectives of the defense program including the creation of facilities for the production of 50,000 planes, and a smaller, but imposing number of tanks and combat vehicles, began to unfold.

In Washington it was reported that the Air Forces plan to order $45 million in machine tools in the immediate future, as part of a preliminary commitment of $150 million, which in turn is part of a total program involving about $550 million in machine tools. These tools will be diverted to aircraft contractors, some of whom have not placed orders for machines as yet.

New Combat Vehicle—In Cleveland, an estimated $106 million increase in the Cleveland Tank Plant commitment, involving the development and building of a "new combat vehicle" was announced jointly by U. S. Army Ordnance and Cadillac officials. The increase raises total tank and combat vehicle commitments of the Cleveland plant to a current value of approximately half-billion dollars.

Question of Balance—Projects of this magnitude bring into critical focus the plans of the machine tool industry to double production this year, and the function of NPA. It seems that the fundamental problem facing NPA's machinery division is to match machine tool production, currently relatively low, with military requirements for machine tools, which are very high.

The question has been asked, "Why doesn't NPA do what WPB did in World War II?" The answer is that the circumstances are different, in both degree and timing.

Had Head Start—Last time, the machine tool industry tuned up on 2 years' of business for foreign customers, and with the advent of Pearl Harbor, was ready to go. The present defense program is set up for an eventuality which nobody can definitely predict.

Priorities for materials and pool orders appear to be the obvious answers to a rapid increase in machine tool production, an important objective not without official recognition in Washington.

Priority Step Coming?—But when the pool orders or Emergency Production Schedules, as they are formally designated, are activated, some distribution order, similar, but not identical to World War II's E-1-B will probably accompany the order.

A priority for materials is reportedly under consideration. When this step is taken, it will probably be done in a way least likely to be ill-received by other manufacturers, who feel that their products are also highly essential to the war effort. Just what this way will be poses a real public relations problem.

Defiance Line Sold—In Defiance, Ohio, the drill press line of Defiance Machine Co., an 80-year-old company which is going out of business, has been sold to Cleveland and Lima, Ohio, interests. Defiance Machine Co. sold its boring mill line to Kempsmith & Co., and its plastic machinery to the Baldwin Co. some months ago.

W. L. Thomas, president Thomas, Inc., machine tool distributors; A. E. Petrus, Petrus Industrial Machinery Sales Co., and George U. Crites, consulting engineer of Lima, purchased the drill press line from Defiance for an undisclosed sum, recently.

British DPC?—Britain, through the Ministry of Supply, will own all machine tools bought for the new armament program. Machines will be leased to manufacturers, but the government will retain the right to move them from one plant to another.

This will permit a flexibility in defense production and put to the best use a limited machine supply.

to remember

Jan. 28-Feb. 1 — Associated Equipment Distributors, annual meeting, Stevens Hotel, Chicago. Association headquarters are at 360 N. Michigan Ave., Chicago.

Feb. 19-22 — American Institute of Mining & Metallurgical Engineers, annual meeting, Jefferson Hotel, St. Louis. Institute headquarters are at 29 W. 39th St., New York.

Mar. 5-7—Hydraulic Institute, quarterly meeting, Santa Barbara Biltmore Hotel, Santa Barbara, Calif. Institute headquarters are at 122 E. 42nd St., New York.

Mar. 5-7—Manufacturers Standardization Society of the Valve and Fittings Industry, annual meeting, Commodore Hotel, New York. Society headquarters are at 420 Lexington Ave. New York.

Mar. 5-7—Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, William Penn Hotel, Pittsburgh. American Chemical Society national headquarters are at 1155 16th St., Washington.

Mar. 5-9—American Society for Testing Materials, spring meeting, Cincinnati. Society headquarters are at 1916 Race St., Philadelphia.

Mar. 6-8 — Society of Automotive Engineers, passenger car, body and materials meetings, Hotel Book-Cadillac, Detroit. Society headquarters are at 29 W. 39th St., New York.

Mar. 12-15—National Electrical Manufacturers Assn., spring meeting, Edgewater Beach Hotel, Chicago. Association headquarters are at 155 E. 44th St., New York.

Mar. 13-15—Assn. of American Railroads, Engineering Div. and Construction & Maintenance Section, annual meeting, Palmer House, Chicago. Association headquarters are in the Transportation Bldg., Washington.

Mar. 13-16—National Assn. of Corrosion Engineers, conference and exhibition, Statler Hotel, New York. Association headquarters are in the Southern Standard Bldg., Houston.

Mar. 14-17—American Society of Tool Engineers, annual meeting, Hotel New Yorker, New York. Society headquarters are at 10700 Puritan Ave., Detroit.

Mar. 19-21—National Assn. of Waste Material Dealers, annual convention, Stevens Hotel, Chicago. Association headquarters are at 1109 Times Bldg., New York.

Mar. 19-21—Steel Founders Society of America, annual meeting, Edgewater Beach Hotel, Chicago. Society headquarters are at 920 Midland Bldg., Cleveland.

Mar. 19-23—Western Metal Congress and Exposition, Civic Auditorium and Exposition Hall, Oakland, Calif. American Society for Metals headquarters are at 7301 Euclid Ave., Cleveland.

Mar. 22-23—Pressed Metal Institute, annual technical meeting, Hotel Carter, Cleveland. Institute headquarters are at 13210 Shaker Square, Cleveland.

Apr. 2-3—Diamond Core Drill Manufacturers Assn., annual meeting, The Homestead, Hot Springs, Va. Association headquarters are at 122 E. 42nd St., New York.

Apr. 2-4—American Institute of Mining & Metallurgical Engineers, openhearth and blast furnace, coke oven and raw materials conference, Statler Hotel, Cleveland. Institute headquarters are at 29 W. 39th St., New York.


BALDWIN
PRESSES

FREE *publications*

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just fill in and mail the postcard on the opposite page.

Universal Joints

Curtis standards of selection, heat treating, strength, accuracy, tolerance, concentricity and smoothness in the manufacture of universal joints are described in a new 6-p. folder. Information is presented on the extensive testing employed for improved quality, and a section of the bulletin presents information on correct universal joint selection. Construction features, as well as purchasing and engineering data, for both the ball type and standard block and pin type joints are detailed. *Curtis Universal Joint Co., Inc.*

For free copy insert No. 1 on postcard.

Broaches and Presses

The new 4-p. bulletin 10052 contains complete specifications and condensed information on a standard line of fluid power broaching machines and presses, illustrating and describing diversified special machines and listing the fluid power components manufactured for direct and resale purposes. *Oilgear Co.*

For free copy insert No. 2 on postcard.

Rust Prevention

Two new bulletins describe Derusto, a durable primer that prevents, absorbs and stops rust on all new and rusted metal. The bulletins show detailed results of a series of tests substantiating the claims made for this material, explaining what these tests mean to the customer in terms of greater efficiency, versatility and economy. Various examples of the wide field of application in industry, agriculture, state and civic facilities and around the home are also listed. *Master Bronze Powder Co.*

For free copy insert No. 3 on postcard.

British Machine Tools

One of Britain's largest machinery houses lists its complete stock of new and used machine tools, presses, sheet metal and woodworking machinery in a 202-p. catalog. Each item is illustrated, accompanied by detailed specifications and descriptive material. Services of a technical and advisory staff are offered purchasers. For overseas shipment, packing is done in the firm's own shops. *F. J. Edwards, Ltd.*

For free copy insert No. 4 on postcard.

Hard Surfacing Mn Steel

"Hard Surfacing Manganese Steel" is the title of a 4-p. bulletin outlining applications, precautions and suggestions on the proper procedures. The folder states that success in the facing of manganese is achieved by avoiding high temperatures throughout the body of the steel, a precaution which should be observed on pieces even as small as a shovel tooth. Where precautions as outlined have been observed, manganese has been successfully hard surfaced, saving users of manganese steel many thousands of dollars. *Rankin Mfg. Co.*

For free copy insert No. 5 on postcard.

Electrode Data

Contents of a 24-p. reference and instruction book, "Welding With Ampco Bronze Electrodes," include technical and pertinent information about every bronze electrode which Ampco manufactures, along with recommended welding techniques, welding procedures, and machining suggestions. Convenient charts covering the selection and preheating of bronze electrodes and the weldability of these electrodes are shown. *Ampco Metal, Inc.*

For free copy insert No. 6 on postcard.

Series-Arc Technique

The series-arc technique of submerged melt welding, a production welding method in which the depth of penetration of the weld metal into the base metal can be controlled, is explained in a new 28-p. illustrated booklet, "Welding with Multiple Electrodes in Series—A New Method of Unionmelt Welding." Use of this method in cladding operations with stainless steels, surface applications with some hard-facing rods, and in nonferrous cladding and surfacing applications are discussed. *Linde Air Products Co.*

For free copy insert No. 7 on postcard.

New Molding Brochure

A new 24-p. brochure covering fully automatic molding of thermosetting plastics describes the origins and growth of automatic molding, from the hand mold press to the fully automatic press. Cost savings by automatic molding are described, showing how it produces uniformity of parts, low mold and labor cost, less molding time, material savings, minimum investment, and controlled inventory. Typical applications for automatic molding are illustrated, together with its adaptability to a wide range of plastics products. Several case histories of successful users are presented. *F. J. Stokes Machine Co.*

For free copy insert No. 8 on postcard.

Radiation Protection

A selection of approved protective equipment of interest to industries directly concerned with the atomic energy field, as well as industrial plants using radioactive isotopes, is presented in a new 8-p.

Turn to Page 72

production ideas

Continued

destructible Copperspun. Cartridge type ball bearings with ample grease space permit sealing for the life of the bearing if desired, but with provisions for easy flushing and regreasing. *Fairbanks, Morse & Co.*

For more data insert No. 19 on postcard.

Sine Fixture Keys

Eliminate milling fixture key slots.

Sine fixture keys make it possible to establish the locating point, bore the fixture key holes and inspect the fixture all on one machine and in one setup. The flats of the sine fixture key base and the top of the shank are tapered to facilitate easy insertion. An additional feature is the locking device that enables the worker to rest the sine fixture key firmly in place by the slight turning of a set screw. *Jergens Tool Specialty Co.*

For more data insert No. 20 on postcard.

Unloading Valve

Features balance piston design for close accurate fit in valve bore.

Used in oil hydraulic circuits to unload one part of the circuit at no back pressure to the tank, a new hydraulic unloading valve is operated by pilot pressure from some other part of the circuit. Free flow to tank continues as long as the pilot pressure is higher than the setting of the valve. The Model 8826 unloading valve is available in sizes ¼ to 1½ in., in two pressure ranges of 50 to 150 psi and 500 to 1500 psi, adjustable from minimum to maximum in both ranges. *Rivett Lathe & Grinder, Inc.*

For more data insert No. 21 on postcard.

Pneumatic Hoist

Powered by rotary type air motor; lifting capacities, 250 to 2000 lb.

A new, lightweight, compact air hoist uses the worm-geared hoisting mechanism of the Detroit-Titan electric hoist, with an air-powered motor in place of an electric motor. The air motor is a sliding vane, rotary type; no pistons or reciprocating parts are involved. The hoist fitted with pendant operated, self-closing control, provides hoisting and lowering speeds that can be varied from a crawl, progressively, to full speed. *Detroit Hoist & Machine Co.*

For more data insert No. 22 on postcard.

Steam Turbine-Generators

High-speed, compact, streamlined; developed in 500 to 7500 kw ratings.

WA Series multi-stage, all-impulse steam turbine-generator units can operate with economical regenerative feedwater heating cycles and can be tied-in thermodynamically to provide a steam-power balance where low pressure process steam is utilized. Governor and regulating characteristics provide for paralleling with existing units and tie-lines. They incorporate the simplicity of three-bearing unit construction with quality multi-stage impulse turbine, housing type generator, and direct-connected exciter construction. *Allis-Chalmers Mfg. Co.*

For more data insert No. 23 on postcard.

Sealed-Hub Wheels

New Airlite Seal wheel offered at 50 pct below present price.

Of cast aluminum with solid rubber tread, the new sealed-hub industrial wheels feature a hub structure incorporating low-cost roller bearings and other economy features. The wheel is said to exclude virtually all foreign matter responsible for excessive bearing and axle wear and deterioration. Zerk fittings permit periodic lubrication of bearings and axle without tieup of handling equipment. Wheels range from 6 to 20 in. diam. *Aerol Co. Inc.*

For more data insert No. 24 on postcard.

Honing Machine

Small machine has working stroke of 15 in. and capacity from ¼ to 4 in.

The machine carries a 1¼-in. diam heat-treated alloy steel spindle, driven by a 3-hp motor through alloy steel reduction gears, with three spindle speeds available. Reciprocation is hydraulic with a 2-hp motor driving a Vickers pump with Vickers controls that permit reciprocating speeds from 1 to 70 fpm. Standard height under the

use postcard below

NEW *production ideas*

new and improved production ideas, equipment, services and methods described here offer production economies . . . fill in and mail postcard.

Boring Tool Sets

Sixteen different combinations to meet varying requirements.

To facilitate the work of jig boring operators various groupings of boring tools are available in convenient, compact form with those shank diameters and lengths of tools required to carry on a particular type work. Hole diameters run as small as 1/16 in. Larger diameter tools have separate cutters, all interchangeable to fit the shanks supplied. Some sets contain ¾ and 1-in. adaptors to fit tools with ⅜-in. shank diam. *Bokum Tool Co.*

For more data insert No. 15 on postcard.

Fluid Transfer Pump

Transfers fluids at 22 gpm emptying 55 gal drum of SAE 30 oil in 2 min.

A new high speed, air-operated transfer pump can be used for transferring lubricants, thinners, coolants, naphthas, and non-corrosive chemicals without spillage, mess or waste. It fits all 2-in. opening drums; has a built-in, disk-type, precision-flo regulator to permit finger-tip regulation of the volume of output. The pump is steel construction, weighing 18 lb. *Lincoln Engineering Co.*

For more data insert No. 16 on postcard.

Aluminum Paint

Extra high heat resistant paint; withstands temperatures to 1700°F.

Known as Heat-Rem H-170, the new paint utilizes a silicone base and fuses with surface metal immediately upon application. It is said to form a bright, elastic finish resistant to moisture, corrosion, mild acids, alkalis and industrial fumes. It sets in 4 hr and dries completely overnight on hot surfaces. *Speco, Inc.*

For more data insert No. 17 on postcard.

Magnesium Anodes

Units contain anodes, backfill in cloth sack, copper wire attached.

The Anode-Pak units consist of a 17 or 32-lb anode packed with a chemically balanced backfill in a permeable cloth sack. A 10-ft insulated copper wire is attached and the complete unit shipped in a carton for instant installation and service. The use of the unit eliminates the need for mixing backfill at the site, and provides a backfill prepared under laboratory control to insure long installation life. *Apex Smelting Co.*

For more data insert No. 18 on postcard.

Induction Motors

Totally enclosed non-ventilated; indestructible Copperspun rotors.

The Fairbanks-Morse line of type QZE, totally enclosed, non-ventilated, squirrel cage, induction motors now includes continuous duty ratings built in NEMA standard frame 284: 7½ hp, 1800 rpm and 5 hp, 1200 rpm motors. Being completely sealed, there are no air passages to become clogged. Cooling is by radiation from the motor frames that are designed to maintain safe and uniform internal temperatures. Rotors are the in-

use postcard below

production ideas

Continued

spindle nose is 40 in. The machine is equipped with full pushbutton controls including pushbutton withdrawal at the end of the honing cycle. *C. Allen Fulmer Co.*

For more data insert No. 25 on postcard, p. 35.

Automatic Sorting Gage

Sorts bushings ½ in. diam x ¾ in. long at rate of 3600 per hr.

Bushings used in telephone lightning fuse units can be measured at the rate of 3600 per hr with an automatic sorting gage. The overall length is measured and each piece automatically delivered into two acceptable lengths and into over and under lengths. The machine is completely automatic; bushings are deposited in the hopper and the gage disposes them

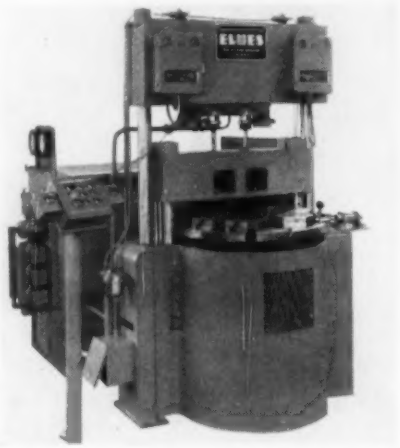
into the proper tote boxes. Federal Electricators and power units are used to measure the bushings and control the segregating units. Signal lights show the operator what is going on at all times. *Federal Products Corp.*

For more data insert No. 26 on postcard, p. 35.

Transfer Press

Designed for the molding of small rubber parts around metal inserts.

Parts are produced on the new hydraulic transfer press at the rate of 20 units per 2-min cycle—10 units per min. The press is equipped with two transfer rams, each of 20 tons capacity. The moving-down die clamp has 60 tons capacity. Lower halves of the die are mounted on a rotating 3-station table providing nearly continuous processing of material, permitting curing and unloading while material is being molded. The press has semi-automatic timed cycle controls, pushbutton operated, with inching features for all movements. The rotating table is mounted on a circular steam plate



to maintain die temperature when dies are out of pressing position. The clamp is provided with a smaller steam plate. Automatic controls maintain constant temperature. *Elmes Engineering Div., American Steel Foundries.*

For more data insert No. 27 on postcard, p. 35.

Hard Chrome Plater

Compact portable unit for hard chrome plating metal surfaces.

Parts up to 10 in. square can be hard chrome plated in the Model A-20 Chromaster. Powered by a dry disk, power pack, selenium rectifier, the unit is complete with plating bath tank, heavy duty rheostat, timer, ammeter and reversing switch for stripping action. The

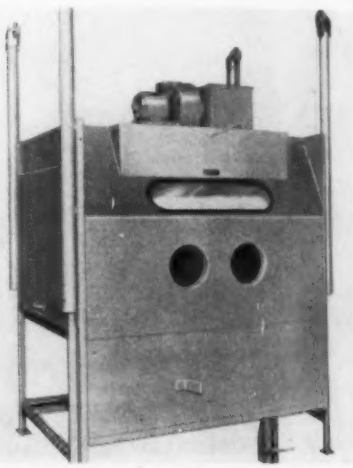
hard chrome deposition can be controlled to tolerances of less than 0.0001 in. Operating at room temperature, Chromasol is a new, noncritical chrome plating solution available in a liquid concentrated form. It delivers a hard chrome plate that follows the exact characteristics of the base metal to which it is applied. The rate of deposition remains constant at 0.002 iph. Using this process 1½ min is said to be the average time required to hard chrome cutting tools and wear parts. *Ward Leonard Electric Co.*

For more data insert No. 28 on postcard, p. 35.

Finishing Machine

Fluid-abrasive blast stops glare, reduces friction, holds lubricant.

In a new surface finishing machine work is placed in the sheet steel cabinet having an inverted pyramid hopper which contains 50 lb abrasive and 8 gal of water. Abrasive is kept in suspension by an agitator and propelled at an 85-oz impact against the work through a syphon-jet type gun attached to a flexible air hose. The operator directs the nozzle from outside the cabinet, working



through arm holes, and observes work through an inspection window. Visibility is maintained by fluorescent lighting inside the cabinet and filtered exhaust system. Air is regulated by a foot throttle. The machine is available in seven standard sizes. *Jewett Mfg. Co.*

For more data insert No. 29 on postcard, p. 35.

Tensioning Setup

Removes foil processing problems.

Scrap losses and machine downtime due to foil breakage are said to be practically eliminated by a new precision tensioning means used on aluminum foil mills built by Lewis & Foundry & Machine Co. The tensioning control is based on use of a high capacity low pressure air brake. Tension produced by this brake can be precisely cali-

Turn to Page 73

View of Harbor Island Laboratory and Testing Station.

New testing station provides expanded facilities for corrosion studies

During the past 15 years, the Atlantic Ocean at Kure Beach served as a giant test tube for studying attacks of sea water and salt air upon more than 35,000 specimens, including virtually all types of metals and alloys.

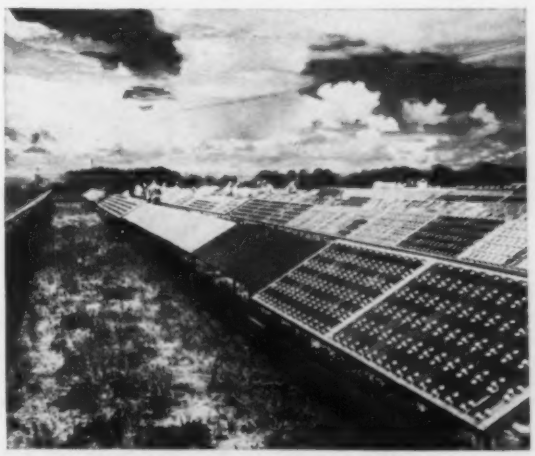
Storm damage to the basin, in which the underwater tests were conducted, compelled establishment of a new and protected testing station. Accordingly, some 15 miles north, on Harbor Island, the new Inco Marine Laboratory was built to provide expanded facilities and an even better "Ocean Test Tube."

This new Harbor Island station, along with the atmospheric test racks retained on the shore of Kure Beach, now widen the scope of cooperative enterprise for fighting industry's common enemy — *corrosion.*

The vast amount of valuable data accumulated over the years will continue to be made available to all industry, as well as to government agencies for whom and with whose cooperation much of the research has been undertaken. You are invited to consult us on your corrosion problems.

Lowering piling test specimens into place. Sea water is something more than a mixture of chemicals; its corrosive action over an extended period can be studied properly only by exposure of specimens to attack under natural conditions.

Running water troughs. For studying the action of sea water flowing at moderate velocities, specimens are immersed in the troughs, shown above. The total length of trough used for this purpose now amounts to about 600 feet.



Atmospheric and spray test lot. Shown above is part of the atmospheric test lot at Kure Beach in which over 20,000 specimens have been exposed, some for over nine years. The racks face south, and the specimens, supported on porcelain insulators, are all set at a slope of 30 degrees.

EMBLEM OF INCO SERVICE

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

IRON AGE *introduces.*

William C. Oberg, appointed manufacturing consultant, U. S. STEEL CO., Pittsburgh. Mr. Oberg joined U. S. Steel in 1911 and prior to his present appointment, was general manager of operations, Pittsburgh district. **John H. Elliott,** appointed general manager—manufacturing.

Robert C. Tyson, elected vice-president of U. S. STEEL CORP., New York. Mr. Tyson will continue as comptroller in addition to his new post.

Kenneth F. Ames, promoted to sales manager, Plains division of the CATERPILLAR TRACTOR CO., Peoria, Ill. **Lee Morgan,** and **Gordon Fowler** will serve as assistant sales managers, Plains division. Other organizational changes: **E. A. Tiarks,** becomes assistant sales manager, Western division, **W. F. Jordan,** assistant sales manager, Eastern division.

Carl J. Meister, appointed vice-president and director of sales of the ATLAS CHAIN & MFG. CO., Philadelphia.

Maurice J. McCarthy, Jr., appointed manager of magnet wire sales of the ANACONDA WIRE & CABLE CO., Muskegon, Mich. **Richard B. Steinmetz,** appointed general manager of mills with headquarters at Hastings-on-Hudson, N. Y.

Milton E. Mengel, named Great Lakes regional manager of BURROUGHS ADDING MACHINE CO., Detroit. **J. Berryman** appointed superintendent of machine assembly and adjusting, and **K. Schwartz** as superintendent of production control, at the Plymouth, Mich. plant.

L. G. Porter, elected treasurer of BORG-WARNER CORP., Chicago.

Alan F. Dill, promoted to the newly-created post of defense regulations coordinator for the AMERICAN WIRE & STEEL CO., Cleveland.

Carl W. Hopp, named assistant manager of the Northwest Division of AMERICAN PIPE CONSTRUCTION CO., Portland, Ore. **Floyd E. Mulford,** advanced to position of assistant sales manager. **Don S. Browne** and **C. Herbert Johnson,** joined the sales staff. **Don S. Burnett,** named production manager.

Robert C. Ross, retired from active service with JOSEPH T. RYERSON & SON, INC., Chicago, after 47 years with the company.

James R. Hitt, appointed manager of the factory branch of the TRAILMOBILE CO., Newark, N. J.

Gordon F. Friauf, appointed general material supervisor at ALLIS-CHALMERS MFG. CO., Milwaukee. **Charles A. McCormack,** retired after 55 years with the company.

C. R. Carlin, elected vice-president in charge of production and **R. K. Lee,** elected vice-president in charge of research and engineering, for the ALLOY RODS CO., York, Pa. Other officers elected: **E. J. Brady,** president and chairman of the board; **M. G. Sedan,** executive vice-president; **W. D. Himes,** treasurer; and **H. L. Weaver,** secretary and assistant treasurer.

A. J. Morrison, elected chairman of the junior board of directors of DRAVO CORP., Pittsburgh. Three new members appointed to the board are **William D. Bickel,** manager of the power department; **Louis P. Struble,** manager of the Keystone Division, and **William H. Collins,** director of advertising.

H. THOMAS HALLOWELL, JR., elected president of the Standard Pressed Steel Co., Jenkintown, Pa.

C. S. BEATTIE, appointed executive vice-president and general manager of Delta-Star Electric Co., a division of H. K. Porter Co., Inc., Chicago.

ALBERT J. BERDIS, appointed general superintendent of U. S. Steel Company's Fairless Works, Morrisville, Pa.

IRON AGE

salutes

Erwin Loewy

HE is a man who has made American industrial strength mightier. His great hydraulic presses and mill machinery are revolutionizing design and production methods in aircraft and other industries. He is putting muscle in the industrial body.

Erwin Loewy, dynamic president of Hydropress, Inc., has built an international reputation for ability to accomplish the impossible. His latest giant is a forging press bigger than any ever built, limited only by manufacturing and transportation facilities.

After World War II the United States Air Force sought the why and how of German hydraulic press development. The Air Force turned to the one man who could best give the answers. Erwin Loewy went to Germany for a 30-day visit and stayed 10 months as an Air Force consultant.

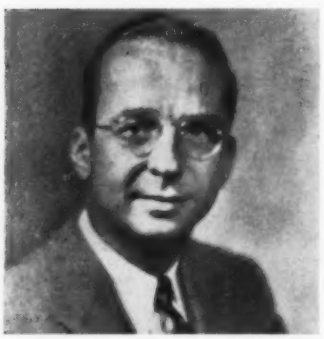
Born in Czechoslovakia, Mr. Loewy studied engineering in Prague, France and Germany. He acquired a wide knowledge of the steel industry while working with a steel supply house in Duesseldorf. Later he became a guiding spirit in Schloemann Engineering Co. in Germany.

The coming of the Nazi forced Mr. Loewy and his associates to transfer headquarters to their British company, Loewy Engineering Co., Ltd. In 1940 he came to the United States and organized Hydropress, Inc.

Mr. Loewy first visited the U. S. in 1926 when he tried to sell heavy presses to American industry. In 1936 he supervised installation of the first Loewy press in this country at the Bridgeport Brass plant.

Prior to U. S. entry in World War II, Erwin Loewy warned OPM this country would need many extrusion presses. It took WPB a year-and-a-half to reach a decision. Then Hydropress built 80 heavy extrusion presses for American industry. He feels this country today stands in the same desperate need for heavy duty forging presses as it did in 1942 for extrusion presses.

SAM B. HEPPENSTALL, JR., elected vice-president in charge of sales of American Forge & Mfg. Co., Pittsburgh.



NORMAN F. SMITH, elected president of The Osborn Mfg. Co., Cleveland.

W. R. PERSONS, elected vice-president in charge of sales of The Lincoln Electric Co., Cleveland.

W. G. ANDREWS, appointed executive vice-president and general manager of Electrofilm Corp.

IRON AGE *introduces*

Continued

Edward O. Boshell, elected chairman of the board of directors and president of the WESTINGHOUSE AIR BRAKE CO., and its subsidiary, The Union Switch and Signal Co., Pittsburgh. **Herbert A. May,** elected senior vice-president of the parent company.

Alexander H. Gaal, appointed a vice-president of the EARLE M. JORGENSEN CO., Los Angeles. Mr. Gaal retains his position as merchandising manager.

Joseph G. Wortley, appointed manager of sales of the KENILWORTH STEEL CO., Kenilworth, N. J.

William K. Honan, appointed a regional manager of ALL-STATE WELDING ALLOYS CO., INC., White Plains, N. Y. Mr. Honan will direct sales and service for the company in all of New England, northern New York state, western Pennsylvania and Ohio.

Peter B. Kline, named manager of stainless sales for the EDGCOMB STEEL CO., Philadelphia.

J. Benjamin Cowan, promoted to the office of executive vice-president of PLASTEEL PRODUCTS CO., Washington, Pa.

Charles H. Disch, retired as vice-president and director of purchases of the WROUGHT WASHER MFG. CO., Milwaukee. Mr. Disch was with the company for 44 years.

A. M. Turner, elected assistant treasurer of the WILLIAMS & CO., INC., Pittsburgh. **W. A. Risher,** appointed manager of the nickel alloys department. **G. E. Pickett,** appointed manager of the stainless steel department.

C. B. House, Jr., and **Lee J. Mohler,** appointed sales managers of two newly established product line sections; the A-C Motor section and the D-C motor and generator section, respectively, of the GENERAL ELECTRIC CO., Lynn, Mass.

C. Russell Conklin, named manager of the Republic Rubber Div., of LEE RUBBER & TIRE CORP., Philadelphia. **Warren Ingersoll,** formerly in charge of the Philadelphia office, becomes assistant to the president.

H. T. Hallowell, Sr., becomes chairman of the board of STANDARD PRESSED STEEL CO., Jenkintown, Pa., the company that he founded in 1903. **Harold F. Gade,** appointed senior vice-president. Mr. Gade is a co-founder. **J. Whiting Friel,** named vice-president in charge of sales; **William I. Kryder,** elected secretary. Mr. Kryder succeeds **Ralph S. Mast,** who is retiring after 46 years of service with the company.

A. G. Hendrickson, joined A. O. SMITH CORP., Milwaukee, as welding equipment sales manager.

Robert C. Kuhn, appointed assistant district manager of the Cleveland sales office of the CRUCIBLE STEEL COMPANY OF AMERICA.

James S. McCullough, appointed sales promotion manager for LAMSON CORP., Syracuse, N. Y.

Edward J. Lilly, named sales engineer for the Butterfield Div., UNION TWIST DRILL CO. Mr. Lilly will be located in Philadelphia, representing the Butterfield Division in Philadelphia and Baltimore.

Howard H. Blouch, appointed sales manager of the Cleveland Plant of the CHROMIUM CORP. OF AMERICA, Cleveland.

John W. Codding, appointed manager of sales of the Boston district, BETHLEHEM STEEL CO., succeeding **Robert B. Wallace,** who has retired after 40 years of service.

OBITUARIES

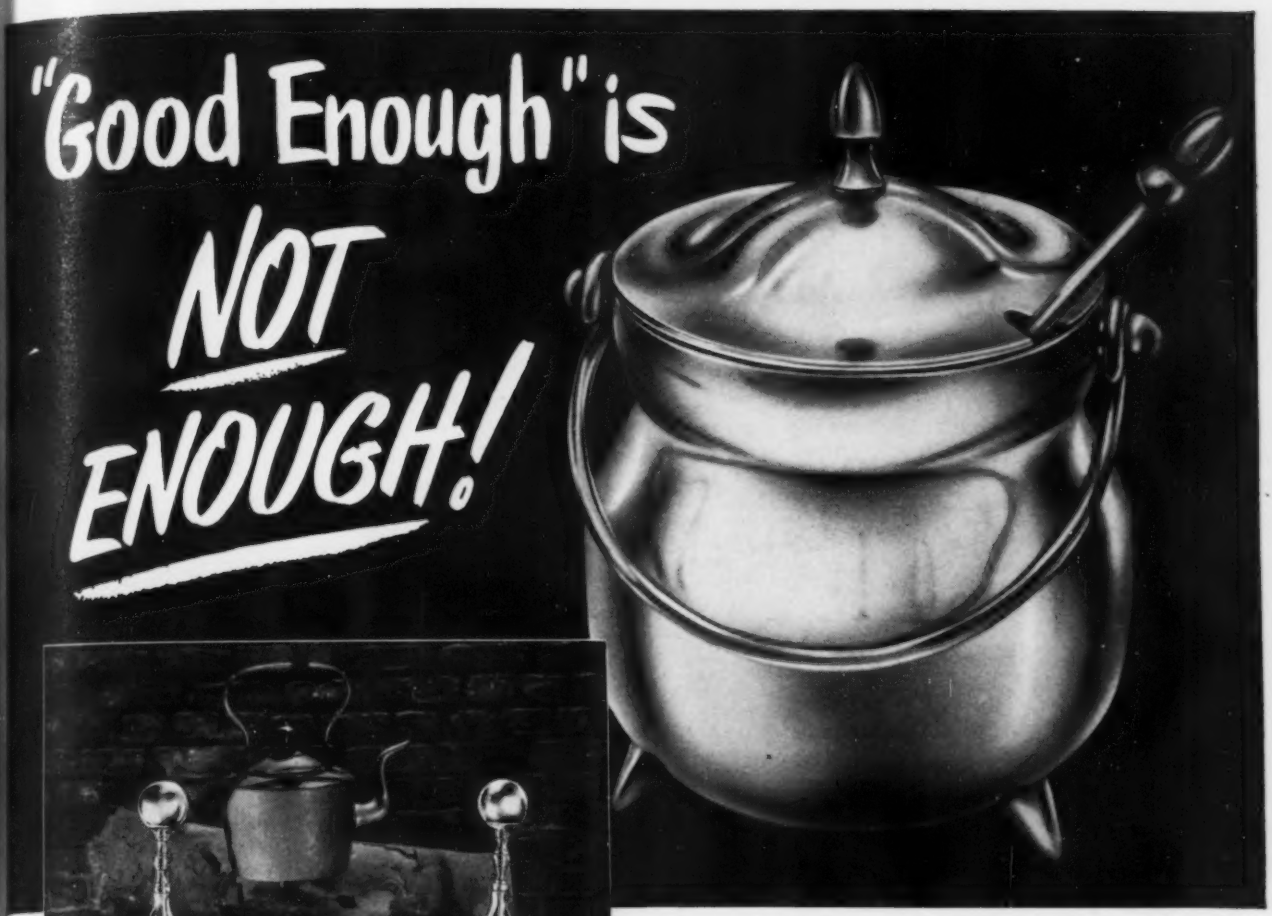
Lionel M. Stern, 77, chairman of the board of The Colonial Iron Works Co., Cleveland, which he founded in 1916, died recently.

Robert N. Anderson, 52, district sales manager of Harnischfeger Corp., died recently.

John Avery, president of Roots-Connersville Blower Corp., since 1946, died recently.

George F. Meyer, 83, president of F. Meyer & Brother Co., and former president of The Meyer Furnace Co., both of Peoria, Ill., died recently.

"Good Enough" is NOT ENOUGH!



Revere Brass of carefully controlled grain sizes is used in the Andirons, the Fire Lighter, the Lighter Cover and the Torch Handle.

• Sometimes a routine laboratory procedure finds ways to make improvements even when everything already is "completely satisfactory". In fact, that is one of the main reasons for carrying out laboratory routines.

A case in point is the Decorative Polished Brass Fire Lighter produced by Peerless Manufacturing Corp., Louisville, Kentucky.

Here is a product that was rolling down the production line and on into homes all over the country. The consumers were satisfied and Peerless was pleased with the appearance of its product. There were no troubles. Nevertheless, the Revere Technical Advisory Service was asked to study the polishing methods and find out if even better procedures would be advantageous.

Just as a routine procedure our laboratory men cut up several of the partly drawn "Pots" and checked on the gauge diminution caused by drawing. The "Lab. Men" are continually doing things like that . . . studying the successful products in order to pile up data which may be useful when they run into a "problem" product.

They found that with a different drawing sequence the draws, although still deep, could be made less severe. The new drawing sequence would permit the use of smaller grained metal. The smaller grain would make polishing easier, even though the product as it went out into the market could have *no* more than the same highly polished beauty it always had.

By testing to find if it could get one cost saving, this company got two.

Perhaps you also are thinking in terms of one slight improvement when two or more are readily available. The Revere Technical Advisory Service offers the laboratory routines which will find out. If you use copper, brass, bronze, aluminum, nickel silver—any alloy which Revere can make—just get in touch with the nearest Revere sales office.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, New York

• • •

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.

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automotive news and opinions

Chrysler show is tribute to engineers . . . V-8 engine features economy . . . Nash wins mechanical design citation.

by Walter G. Patton

Carmakers Have a Case—The opinion is growing in Detroit that automobile producers will be permitted to raise their prices based on a formula yet to be developed. The carmakers have a good case. One producer has estimated that between June and December the price of raw materials alone going into a car has increased more than $125 per car.

During the past 6 months, the price of crude rubber has jumped 130 pct. GRS rubber is up 6 pct. Synthetic rubber has advanced 12½ pct. Tin prices have increased 93 pct and lead is up 44 pct. The upward swing in zinc prices is 19 pct. Wool costs have gone up 59 pct.

Tribute to Engineers — The Chrysler engineering exhibit held last week at the Massachusetts Ave. plant in conjunction with the introduction of 1951 Chrysler models is undoubtedly the finest tribute yet paid to the automobile engineer. It was an engineer's show—a great personal triumph for the entire Chrysler engineering staff.

In addition to new Chrysler products—the 1951 line of cars, the new V-8 Fire Power engine, power steering, Oriflow shock absorbers, automatic transmission and air cooled brakes—Chrysler displayed impressive exhibits of the research tools used by the up-to-date engineer to develop these products.

Complex Rocker Arms—The new Chrysler V-8 engine is, of course, the No. 1 exhibit. Most ingenious feature of the new powerplant is the complex rocker arm assembly which requires two rocker arms, two hydraulic valve lifters and four push rods for each cylinder. This arrangement eliminates the necessity for an overhead cam, greatly simplifying the servicing problem.

Engine Breathes Better—Tests indicate the new engine will give an 11 pct improvement in economy. The valve position in the hemisphere head is such that the valves are approximately at right angles to each other. This permits improved "breathing" and is one of the reasons for the Chrysler claim of improved combustion efficiency, less build-up of carbon, varnish and other products of combustion. Incidentally, auto engineers agree that the build up of deposits in a dirty engine may reduce the effective octane rating of fuel from 11 to 15 points.

The new Chrysler engine will undoubtedly cost more to build than previous engines. Valves, for example, are equipped with two springs each.

Submarine Auto—Dodge is assembling four types of military vehicles on the same production lines used for civilian trucks. Last week the company began production on a $92 million order for military trucks, including cargo vehicles, telephone and maintenance trucks, utility trucks and wheel-drive field ambulances.

Incidentally, with a snorkel tube fitted on the engine and tail pipe, the new Dodge utility vehicles will operate in water which would normally be over the driver's head. After setting the throttle, the driver is able to sit on the roof and steer the vehicle with his toes. The ignition system is completely water-proofed. Breathing for the engine is provided through the front snorkel.

Squeak-Proof Brakes—Another Chrysler engineering first will undoubtedly be new molded brake lining used on trucks. The lining is said to be a design that eliminates squeaking of the brakes.

Some Overtime Scheduled — A substantial part of the decline in automobile output has been attributed to elimination of overtime work. Most Detroit sources believed that overtime in the auto plants would be largely eliminated during 1951. However, Buick has

assembly line

Continued

scheduled Saturday operations. There is a possibility that at least one other General Motors division will work Saturdays. This is another indication that car producers will continue to turn out as many cars as they possibly can in the face of growing government-imposed restrictions.

Chrysler Croning—In the Chrysler show a small pump casting was on exhibit made by the so-called Croning or shell mold precision casting method. Thus, Chrysler publicly joins Ford and General Motors in what promises to be the most important foundry development during the postwar period. (THE IRON AGE, Aug. 3, 1950.)

Rambler Gets Decorated—The 1951 Nash Rambler convertible has been awarded the "Modern Designs" citation for "general excellence in mechanical design." In bestowing the award on Meade F. Moore, Nash director of research, the new Nash front suspension that "reduces the unsprung weight and gives superior riding qualities in a shorter wheelbase automobile" was specifically cited.

Metal-Coated Plastic — Another interesting Chrysler exhibit was a plastic part plated with chromium. Just how the plating is accomplished was not disclosed but it is believed that electricity conductors are present in the plastic itself. No surface coating is necessary, according to Chrysler engineers.

Chrysler "Make Ready"—K. T. Keller, chairman of the board, indicated that Chrysler Corp. spent $50 million for "make ready" and tooling of its 1951 models. In addition to tooling the new engine and transmission for its 1951 models, Chrysler made many body changes requiring new dies for the fenders, top, grille and other formed parts. At the last minute, the die for the front corner post was scrapped to make possible the use of a narrower design.

One-Finger Steering—Hit of the Chrysler Show as far as the customers were concerned was power steering which reduces steering effort by nine-tenths. The pressure of one finger and the guidance of the thumb is all that is required to rotate the wheel. Hydraguide Power Steering will be available on all 1951 Chrysler Imperial and New Yorker models.

Price has not been announced but it is expected to be in the $125 to $150 range. Incidentally, most observers here predict power steering will be adopted by Cadillac and perhaps other GM divisions in 1952.

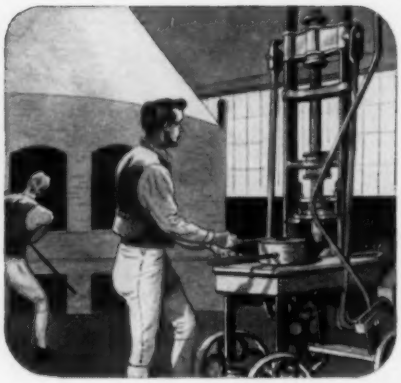
Available Immediately—The new Chrysler Fire Power V-8 engines will be available immediately in all Chrysler, New Yorker and Imperial models. Power steering will also be used on these models. No announcement was made last week about the Chrysler torque converter which, incidentally, requires a considerable amount of aluminum, a metal which will be taken heavily by defense.

Four Traveler Models — The Kaiser Traveler for 1951 will be available in four new models. With the rear panel open and the tail gate extended, the cargo capacity has been increased to 105½ cu ft. Floor area is 108 x 46 in. The spare tire is recessed into the floor. The Traveler, which doubles as a special purpose vehicle for ambulance, farm and sales work, is generally lower in price than station wagons which are often used for the same purpose.

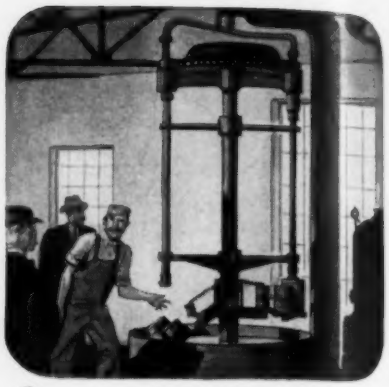
Study Gear Failures—Gear design is an uncommon cause of failure in service, J. O. Almen, General Motors Research Laboratories consultant, told the Society of Automotive Engineers recently. Almen disclosed that in GM Research Laboratories more than 2 million gear histories were examined but only 100,000 failures could be attributed directly to design.

THE BULL OF THE WOODS By J. R. Williams

1 **1621**—Glass was money! America's first glass factory was actually a mint—not for the manufacture of coins but to make glass beads for *use* as money when buying land, food and furs from the Indians.



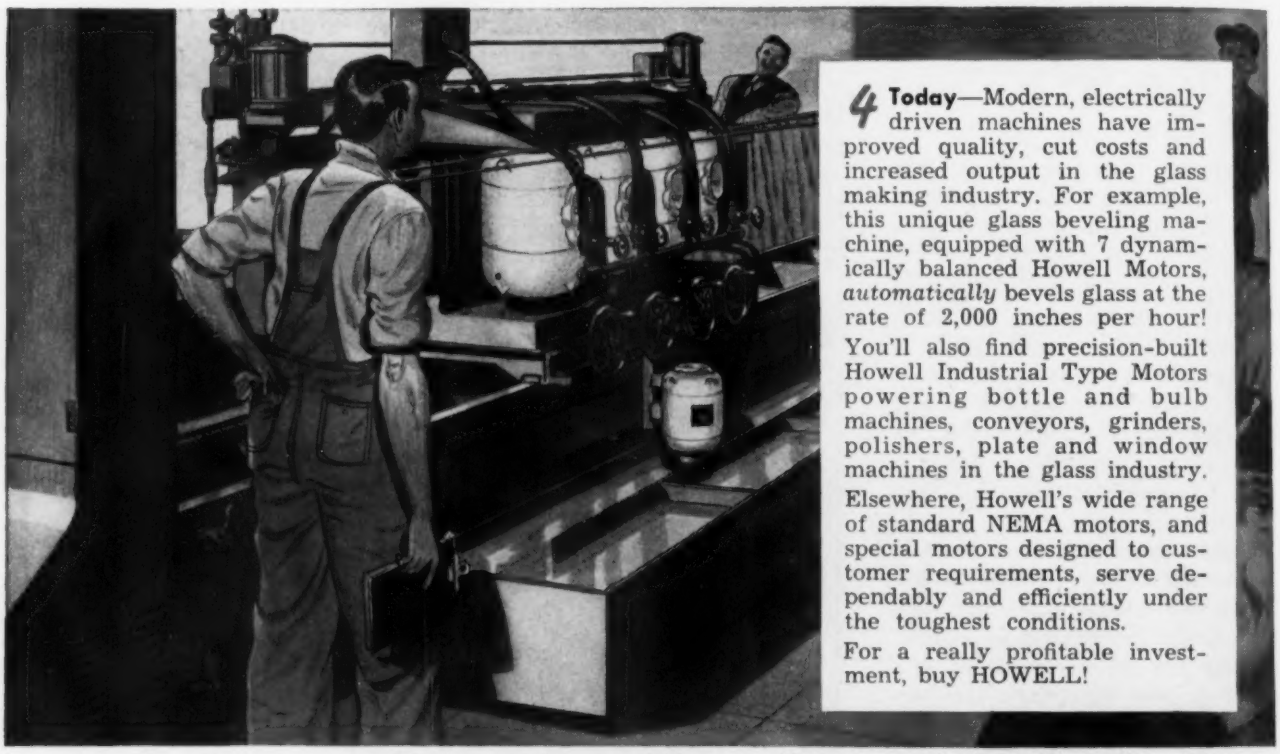
2 **1827**—Blown glass was the rule until Enoch Robinson, a carpenter, figured glass could be *pressed* into shape . . . the glass pressing machine was born. Electricity to power new machines was still to come.



3 **1899**—Owens invented a machine to make bottles as the machine age arrived in glass. By 1915, Howell "Red Band" Motors were making important contributions to this and other industries.

ANOTHER HOWELL SUCCESS STORY

GLASS...from artisans to automatic machines



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HOWELL Red Band MOTORS

west coast progress report

digest of far west industrial activity

by R.T.Reinhardt

Who Is Going to Do What?—Though the powers-that-be are loath to reveal who has applied for certificates of necessity to construct steel plants, it is known at least two applications are on file from western interests.

One unidentified group has applied for its certificate to construct a 1,200,000 ton capacity steel plant in central California claiming to have a deposit of 80 million tons of 64 pct iron ore in reserve.

Steel Plant in Nevada? — Another group claiming to control important iron ore deposits in Nevada is seeking to build an integrated steel plant in that state.

While conceded that western steel capacity is lagging behind even normal consumption, some steelmen argue that neither of these projects would be economically feasible. However, many steelmen held similar views in the early 1940's in regard to the Kaiser operation at Fontana.

Jittery Scrap—While western members of the scrap trade were attending the 23rd annual convention of the Institute of Scrap, Iron & Steel in New York last week, the California scrap market began to bubble and boil.

Although mills are still quoting an offering price of $30.00 per ton for No. 1 heavy melting in San Francisco and Los Angeles, considerable tonnages have moved at prices up to $34.00 per ton. Apparently the larger mills have been able to meet requirements at the lower figures but independents have had to go higher.

Particularly noteworthy has been an advance in the price of railroad scrap from transcontinental lines which has gone up to $46.00 per ton. Previously this grade was available at the current price of No. 1 heavy and is still available at that figure from railroads without transcontinental connections. Lines such as the Santa Fe and Southern Pacific can readily and economically haul their western scrap to Chicago where the current price is in the neighborhood of $45.00 per ton.

Awkward Spot—This puts western buyers in the awkward position of having to pay practically the Chicago price for railroad scrap or else see it leave this territory which is already pressed for metallics.

Western scrap dealers fully expect price freezes and hope they will be in the neighborhood of $35.00 per ton for No. 1 heavy, approximately twice the OPA figure during the last freeze. On the other hand, buyers are hoping for and anticipate a price in the neighborhood of $30.00 a ton.

In Los Angeles, scrap dealers are having a problem holding crane operators now being paid $1.50 per hour while contractors working for the government are paying as high as $2.35 per hour. This situation is cited as further justification for higher prices.

May Boost Aluminum Production—Aluminum producers in the Pacific Northwest may not much longer be faced with the need to curtail production because power supplied on an interruptible basis is periodically denied them.

If Congress approves the order of the Secretary of the Interior for the construction of a 140-mile high voltage transmission line connecting the Columbia Basin Power grid with that of the California Central Valley Project, 100,000 kilowatts of BPA power would be firmed up.

Bonneville now has an interruptible load of about 250,000 kilowatts, most of which is supplied to aluminum reduction plants in Washington and Oregon.

Kaiser Magnesium—Practically the same personnel will be in charge of production of magnesium at the Manteca, Calif., plant, to be reactivated in July by Kaiser Aluminum & Chemical Corp., that handled its operation during the past war. This unit has a rated capacity of 20 million lbs of magnesium metal per year.

CHASER LIFE DOUBLED

JOB DATA

Part: Packing nut
Operations: Drilling, forming, threading, cut-off
Machine: 4-spindle Acme Gridley, using high-speed tools
Metal: 420 stainless steel

. . . staining and leakage problems also solved when manufacturer* changed to TEXACO Cleartex Cutting Oil

The stainless steel used on this job is one of the toughest metals to machine. Operators reported their greatest difficulty was frequent breakage of the threading chasers, none of which lasted more than three shifts (24 hours). In addition, leakage of machine lubricant into the cutting fluid caused contamination and high oil consumption.

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the federal view

this week in washington

by Eugene J. Hardy

Trial CMP—A "trial run" for a Controlled Materials Plan is in the works at the Defense Dept. and NPA. The Munitions Board has reportedly asked the Army, Navy, and Air Force to have ready by Feb. 15, requirements for basic raw materials so that a start on CMP can be made. Extent of the "trial run" or the materials covered has not been revealed.

NPA says that a complete CMP for nonferrous metals is likely to come first. It is estimated that if complete allocation of steel under CMP were decided upon now, it would be fourth quarter 1951 before a staff could be ready to administer it.

Terminated Contracts — The World War II hassle over final review of terminated contracts is up again and this time Controller General Lindsay Warren who lost his earlier battle for review appears to have won the first round. The Defense Dept. has circulated to industry its proposed contract termination section of the Armed Services Procurement Regulations. The section does not contain a "finality" clause which means that a terminated contract agreed to by the firm involved and the contracting officer will not be final, but subject to further audit by Mr. Warren's General Accounting Office.

Mr. Warren has groused about losing his fight for review in the latter stages of World War II when he carried the fight before key Congressional Committees. Industry can be expected to go to Congress again, for GAO review of terminated contracts only means interminable delay.

Tax Battle Looms—Despite talk from the White House, generated by the Council of Economic Advisers, of a tax boost this year amounting to between $20 and $25 billion, Congress will not enact any such program, barring all-out war.

Top Treasury officials privately admit that there is little hope of gaining any more than $10 billion additional in taxes to ward off an estimated deficit of $16.5 billion. It is also likely that Congress will not enact a tax measure before mid-1951 at the earliest, despite White House screams for haste. Congress is none too happy about inclusion of the whole Fair Deal program in the Budget Message.

Government Plants — President Truman has followed up his recommendation for new legislation authorizing direct Government construction of industrial facilities with a budget estimate of $1.2 billion to cover this and other items. Even if Congress does not approve such Government construction a large portion of this amount will be used for loans, long-term purchase contracts, incentive payments, and government equipment for installation in defense plants.

Control Funds Up—Budget estimates of $330 million dollars for administration of economic controls indicate the extent to which controls will be imposed during the coming fiscal year. Currently, the control agencies are operating under a $30 million appropriation and there is a request before Congress for an additional $10 million.

While the amount requested for fiscal year 1952 is about ten times greater than existing appropriations, it is still well below World War II totals when the peak was greater than $2 billion. The $330 million is also about twice the amount granted OPA at its peak, although this sum is designed to cover all existing control agencies.

Point 4 Changes—The Administration's "Point 4" program of aid for underdeveloped areas of the world is changing direction as a result of the expanded mobilization effort. It is now being termed a security program for these areas which will be expected to speed up production of strategic materials in return for technical aid and dollars. Previously, the State Dept. regarded the program as an almost sacred universal "uplift" society and had rejected any idea of getting materials in return for this type of aid. The policy had been guided by the feeling that getting something in return would serve to "destroy the atmosphere."

INLAND DATA for STEEL USERS

INLAND STEEL CO.

38 S. Dearborn Street, Chicago 3, Illinois

The role of Scrap in Steel Making

One of the most important raw materials in steelmaking . . . one frequently underrated by the casual observer . . . is iron and steel scrap. With over 90% of all the steel in the U. S. being made by the open hearth process, the scrap used by steel producers totals approximately 50,000,000 tons each year.

The open hearth method of steel production is geared to a pig iron scrap consumption ratio of roughly 50-50. This is to the final advantage of the steel user, since a large scrap diet in steelmaking results in a number of benefits: (a) steel is made faster (since scrap has already been "refined" once before, the "melt" time in the open hearth is decreased); (b) vital raw materials are conserved (it takes almost 4 tons of iron ore, coal and limestone to make a ton of pig iron); (c) unless scrap prices are abnormally high, the price of steel is cheaper; (d) steel is of higher quality (since scrap has already undergone one refining process); (e) transportation facilities, instead of being used for the additional raw materials otherwise required, can be released for other uses; (f) steel mill capacities can be expanded more readily with less emphasis on the blast furnace and more on open hearths and rolling mills.

About two-thirds of the scrap consumed in making steel comes from the steel mills themselves. Crop ends and sheared edges move quickly back to the open hearth shop. The remaining third, flowing to the mills largely through the 6,500 scrap dealers in the U.S., comes from the wastage in metal working plants ("production" scrap), auto graveyards, old building, bridge and ship wrecking projects, railroads (worn rails, freight cars, etc.), neighborhood junk peddlers.

The scrap dealers must sort the scrap so that the undesirables are eliminated, the alloys segregated and the right kinds of scrap can be delivered in large tonnages to the mills for most efficient steelmaking practice.

Today, with steel production at record peaks and with capacity continually expanding, it is more important than ever to keep scrap flowing back to the steel mills from *every* source. Everyone waiting for steel can help himself by assisting the movement of his scrap through his regular channels.

THE SCRAP CYCLE

CONTINUOUS CASTING PROCESS

EMPLOYS A

moving mold

Each year sees more ideas and patents added to the files on continuous casting. Some are new approaches, but basically most are improvements or refinements of existing or expired patents. The Hazelett process is not new (THE IRON AGE, March 21, 1935, and April 11, 1940, p. 44). The former Hazelett machines are no longer in use.

A moving mold rather than a stationary or oscillating mold has been the aim of C. William Hazelett of Hazelett Strip Casting Process Co. for years. The latest design, which is 7 machines and 15 years later from the first unit Hazelett ever built, is shown in Fig. 1. The mold consists of two steel belts revolving over drum pulleys. The outside of the belt mold wall is shower-cooled with water. Molten metal is introduced into the cavity between the two belts and it solidifies and moves forward with the belts through the mill. The speed of the pilot plant mill in Fig. 1 varies from 27 to 35 fpm and a number of aluminum slabs 9 x ½ in., weighing 25 lb, have been cast. These slabs have an excellent surface as shown in Fig. 2. The edges of these slabs are also smooth with a slight convex contour.

The process appears to be well suited for continuous casting of flat shapes in aluminum.

By D. I. BROWN
Feature Editor

Water-cooled steel bands traveling over drum pulleys form the mold in the latest Hazelett machine. The mill requires very little space and power requirements are very small. Production machines for brass and aluminum are under consideration.

There is more work to be done on methods of introducing the metal into the mold. No attempt was made in trial runs to protect the aluminum from oxidation as the first aim was to establish that a sound section could be cast. Micros of one of the sections are shown in Fig. 3. The porosity and oxides, it is believed, can be eliminated by adding a suitable feeding device which will exclude air from the molten metal. A design for such a feeding method appears at the left of Fig. 4. The metal will thus be fed continuously into the concave mold section. The contours of the mold which hold the metal during solidification are of extreme importance. On p. 53 a scale model of the rolls and the metal band mold are shown. The convex rolls shape the metal band and this shape changes until a perfectly flat and rectangular section is produced prior to complete solidification of the metal throughout the section. These different mold contours are shown in the top righthand corner of Fig. 4.

Mill Occupies Small Space

The mill requires very little space. The pilot plant at Greenwich, Conn. occupies an area 15 x 15 ft square. This includes the controls, pumps, melting unit, etc. The control panel of the small unit is quite simple. Very little power is required. The mill shown in Fig. 1 employs a 1-hp motor to drive the moving mold and a 5-hp motor for pumping water at a rate of 400 gpm.

The mill is only 6 deg off horizontal which is an added advantage. Cast slabs can be cut with a regular shear or the continuously cast slab could be fed into a 4-high single stand hot mill for reduction into strip. Very probably a reheating furnace would be necessary so that the casting unit would not have to be confined and regulated to deliver a cast slab at precise rolling temperatures.

Satisfactory Edging A Problem

One of the big problems of the moving belt mold is satisfactory edging. The edge sides of the mold do not move in the present pilot model. The sides, called side dams, which appear in Fig. 4, are made of brass and are water-cooled. Although these dams have produced satisfactory edges, a movable side is being designed. Water which flows over both exterior sides of the metal belt is kept from overflowing the edge by a tight spring clip trough.

The tonnage which can be produced will not be known until a commercial installation is made. It is believed that a 28-in. wide mill could produce 40 to 100 tons of aluminum per hr, de-

FIG. 1—Pilot plant mill which has continuously cast aluminum and brass slabs.

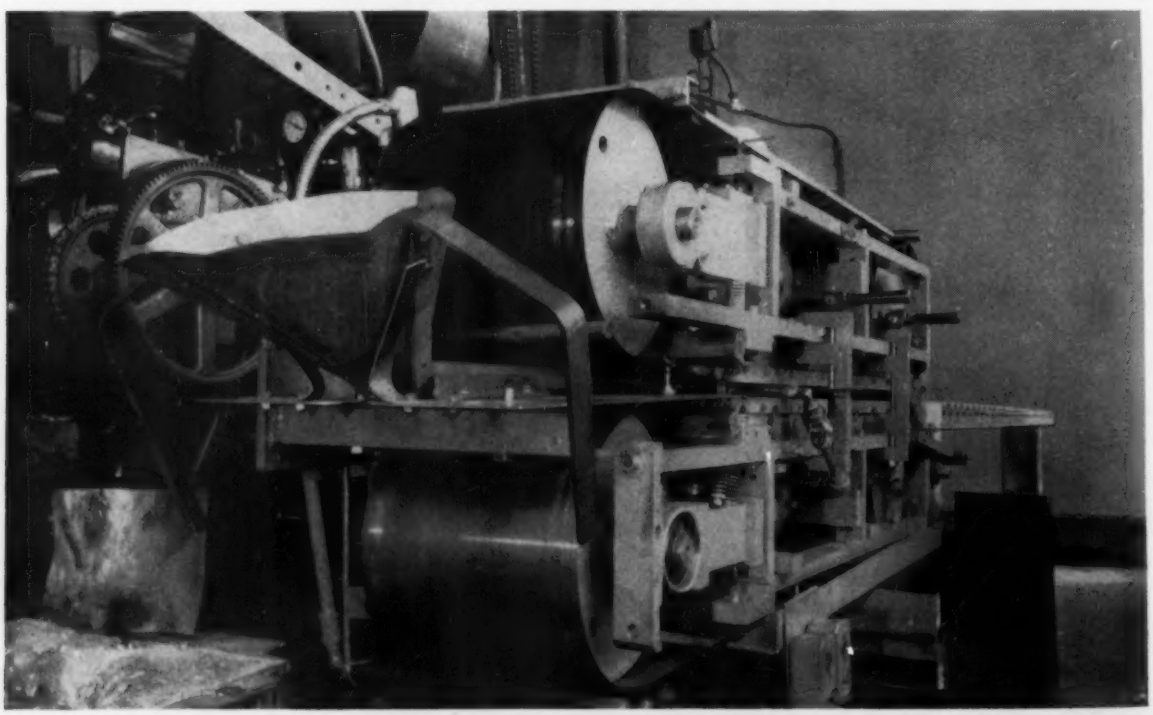


FIG. 2—As-cast surface of aluminum slab, shown at the delivery end of the mill. The remarkably good surface finish is typical; the photograph has not been retouched in any way.

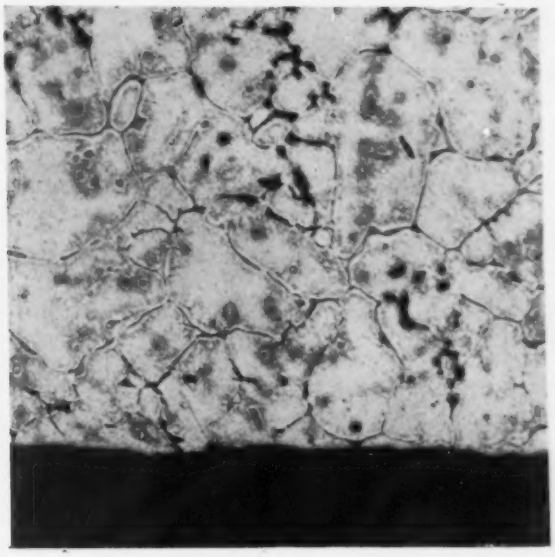


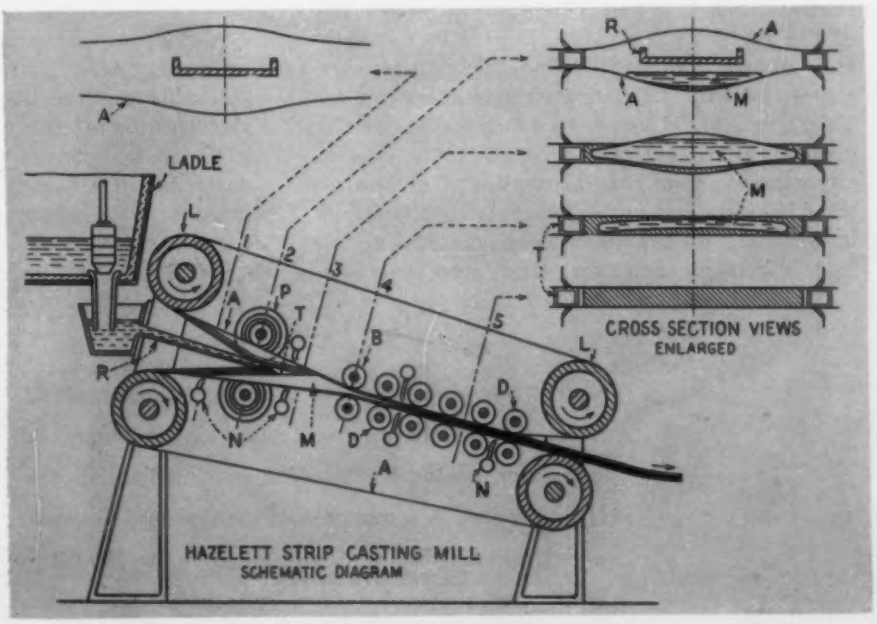
FIG. 3—Micro of cast aluminum shows porosity and oxide inclusions. These defects will be eliminated with proper protective feeding devices in production units. (120X.)

pendent on gage. Tonnage would vary inversely with the thickness and lineal production varies with the inverse square of the thickness of the slab. All parts of the Hazelett mill which control gage are water-cooled. Since no work (reduction) is done on the metal, very little power is needed to drive the mill.

The cast slab chills quickly and like other continuous casting methods, uniform analysis across the slab can be expected. It is now evident that the old troubles of segregation and folding which Hazelett encountered on previous designs have now been eliminated. Some thought has been given to casting of steel slabs with this machine but it is yet too early to tell if this can be done. There are problems of temperature and suitable refractories plus a lot of experimentation on speeds that must be made before the process can be evaluated for continuous casting steel sections. However, brass has been run through the machine and a production plant for 70-30 brass may be built this year. The process also has good possibilities for the casting of magnesium slabs.

FIG. 4—Schematic drawing of the Hazelett mill. A plug is inserted at X. This plug serves as a momentary dam to permit the metal to fill out the mold contour. The plug then passes through the mill ahead of the cast slab. A cross-section of the feeding spout (R) appears at upper right in position relative to the mold contour.

A *Moving strip mold*
B *First pressure or flat roll*
D *Other flat work rolls*
L *Drum pulleys over which steel band mold revolves*
M *Molten aluminum in various stages of casting*
N *Water supply nozzles*
P *Concave pulleys which shape mold contour*
R *Spout which introduces the metal into the mold*
T *Water-cooled side dams which edge the cast slab*



German and American STAINLESS compared

By C. A. ZAPFFE
Consulting Metallurgist
Baltimore

In April 1949, a Stahl-Eisen-Werkstoffblatt was published in Germany, standardizing the compositions of wrought stainless steels for the German industry. This listing is similar to the American Iron and Steel Institute classifications in this country, which provides American metallurgists with the familiar type numbers for stainless steels. Stainless steels were discovered and developed in Europe at the turn of this century,[1] spreading thereafter to America where they have attained world-wide records in production; a comparison of the current German and American standard listings is therefore both interesting and informative.[2]

Restricting attention to the wrought stainless steels, Tables I, II and III present a compilation of the standard analyses compiled in Germany and America in 1949. The tables are constructed with a view to matching similar grades. This is not always easy to do, and some of the groupings are entirely arbitrary. It is also important to note that a number of grades on the AISI list come under separate specifications in Germany on the basis of heat-resisting alloys, electrical resistors, and special steels. Gaps in the tables therefore do not necessarily mean that a grade of a corresponding analysis is not made in Germany.

Because of shortages of nickel in Germany, particularly acute during World War II, manganese and nitrogen were substituted as austenitizing elements in the Class III (austenitic) grades. Some of the alloys are listed in Table IV. Results of the substitution were interesting; but these ersatz elements never did fully replace nickel, and they have been largely abandoned since the war. Table III lists the only standard German grade containing special additions of manganese; none contain nitrogen.

Use Higher Manganese Ranges

Nickel in German analyses still reflects a shortage. AISI Class III steels show a considerably greater liberality, particularly when stabilization of the austenite is desirable.

Minor manganese contents in general, and particularly in Class III, tend to be much higher in America, a maximum of 1.0 pct in Classes I and II (martensitic and ferritic, respectively) and 2.0 pct in Class III, comparing with the

Currently-used compositions of wrought stainless steels have recently been standardized in Germany in a manner similar to the AISI classifications in the United States. A comparison of the standard German and American listings is interesting in an historical sense and informative from a technical viewpoint.

German range of 0.2 to 0.4 pct for all classes. These maximum specifications permit, but do not require, high manganese contents; nevertheless, the statement as made is proper in its broad reference. This is primarily the result of an importance placed by American metallurgists on the improvement of hot workability afforded by manganese in carbon steel—also its slightly austenitizing effect. German metallurgists are not as strongly impressed with the effect of manganese on hot workability so far as stainless steels are concerned, and the point is worth considering.

Stabilizing Practice Differs

In stabilizing the Class III steels, German practice shows a number of distinctions: (a) tantalum is sometimes used, as well as titanium and columbium; (b) Class II steels are also often stabilized; (c) carbon contents of the stabilized grades tend to be higher than in American practice; (d) lower ratios of titanium and columbium to carbon are used, and (e) stabilization heat treatments are rarely administered to the stabilized grades.

The higher carbon content is attributable to the high cost of low-carbon ferrochromium, also to a scrap problem with regard to carbon pick-up. Attention of German metallurgists, however, is on the recent procedure of decarburization by gaseous oxygen, which may allow a change in stabilization practice. As for the stabilization heat treatment, they do not regard its importance as having been demonstrated.

A proportion of ferrite is often preferred in German Class III steels as a guard against sensitization. They find that the presence of 10 to 20 pct of ferrite causes no appreciable change in mechanical properties, and in addition provides a surprisingly rapid recovery from sensitization. For example, a steel containing 22.6 pct Cr, 10.2 pct Ni, and 0.09 pct C —15 pct ferritic—developed sensitization in 1 hr at 600°C (1110°F); but after 50 hr at this temperature, sensitization had vanished.

This, they explain, is the result of diffusion of chromium from the ferrite, which by thermodynamic definition is chromium-rich with respect to accompanying austenite. American practice has hesitated to utilize a presence of ferrite, because ferrite (a) is subject to embrittlement in the range of 400° to 550°C (752° to 1022°F) (475° embrittlement), (b) is susceptible to embrittlement from sigma phase in the temperature range 600° to 950°C, (1112° to 1742°F) (c) is definitely disadvantageous to hot workability, (d) lowers creep resistance, and (e) probably favors stress-corrosion cracking.

Molybdenum More Widely Used

Molybdenum is much more widely used in Germany, being added to numerous alloys in all three classes, and particularly in Class III (see Table III). Molybdenum in stainless steel was an original German development, first patented in 1910 by the top discoverer of stainless steel—P. Monnartz[1]—and the use of that metal received a second impetus in its home country during the recent war. German practice rarely if ever uses the molybdenum grades for high-temperature service, whereupon embrittlement from sigma phase is not important. AISI Types 316 and 317 carry more molybdenum than the corresponding German grades; but for piercing operations German steels carry a

TABLE I

CLASS I—MARTENSITIC

German Steel		AISI	Analysis in Pct of Weight						
No.	Name	No.	C	Cr	Ni	Mo	Mn	Si	Other Elements
4001	X10 Cr 13	403	<0.15	11.5–13.0	.....	.....	<1.00	<0.50	.....
		410	<0.15	11.5–13.5	.....	.....	<1.00	<1.00	.....
		....	<0.12	12.5–13.5	.....	.....	0.2–0.4	0.3–0.5	.....
		(410-C)	(≈0.20)	.....	.....	.....	.....	.....	.....
4021	X20 Cr 13	....	0.17–0.22	12.5–13.5	.....	.....	0.2–0.4	0.3–0.5	.....
*4120	X20 Cr Mo 13	....	0.17–0.22	12.5–13.5	.....	1.0–1.3	0.2–0.4	0.3–0.5	.....
		414	<0.15	11.5–13.5	1.25–2.5	.....	<1.00	<1.00	.....
		416	<0.15	12.0–14.0	.....	.....	<1.25	<1.00	P, S, Se >0.07; Zr, Mo 0.60
		420	<0.15	12.0–14.0	.....	.....	<1.00	<1.00	.....
4034	X40 Cr 13	....	0.38–0.43	12.5–13.5	.....	.....	0.2–0.4	0.3–0.5	.....
*4122	X35 Cr Mo 17	....	0.33–0.40	16.0–17.0	.....	1.0–1.3	0.2–0.4	0.3–0.5	.....
		431	<0.20	15.0–17.0	1.25–2.5	.....	<1.00	<1.00	.....
4057	X22 Cr Ni 17	....	0.20–0.25	16.5–17.5	1.3 –1.8	.....	0.2–0.4	0.3–0.5	.....
		440-A	0.60–0.75	16.0–18.0	.....	<0.75	<1.00	<1.00	.....
		440-B	0.75–0.95	16.0–18.0	.....	<0.75	<1.00	<1.00	.....
		440-C	0.95–1.20	16.0–18.0	.....	<0.75	<1.00	<1.00	.....
*4112	X50 Cr Mo V	....	0.45–0.55	17.5–18.5	.....	1.0–1.3	0.2–0.4	0.3–0.5	0.07–0.12 V

* Classified as special steels; the others are for general application.

higher molybdenum content than the American.

Free-machining modifications are much more widely explored and exploited in America. Germany seems still in the "sulfur stage," compared to our developments with selenium and the several combinations among sulfur, selenium, phosphorous, zirconium and molybdenum. Class III alloys containing silicon are more widely used in Germany, particularly for welding and for protection against pit corrosion.

Germans Lack Some U. S. 400 Grades

The following alloys, considered important in America, apparently remain more or less unused in Germany: (a) free-machining modifications of Types 410, 420, 440, 302, (b) free-spinning Type 305, (c) free-machining grades containing selenium, (d) Type 405, ferritized with an aluminum addition (3) 12-2 compositions, such as Type 414.

On the other hand, Germany utilizes: (a) partly ferritic Class III grades, besides that containing manganese, (b) austenites sometimes having additions of nitrogen, (c) a 12-12 analysis similar to that used in England, (d) a hardenable Class I analysis containing vanadium, (e) some special stabilized grades, particularly distinctive in Class II, (f) novel compositions employing molybdenum additions in all three classes.

In Class I compositions, manganese and silicon specifications are considerably lower for German alloys, the maximum of their specification being less than customary minimums for actual American analyses. The German Nos. 4021 and 4120 do not correspond to any standard American grade, but are similar to the nonstandard analysis sometimes referred to as Type 410-C. The Germans have therefore publicly recognized the necessity for an alloy intermediate between AISI Types 410 and 420 —a matter of some current concern in America. Their addition of more than 1 pct Mo to one of the twin listed alloys may deserve a continuation of our brief wartime notice given a similar steel.[3]

Germans Use No Free-Machining Class I's

No free-machining analyses are listed in the German standards for Class I. Their No. 4122 is unlike any American analysis, combining the carbon content of Type 420 with the chromium content of Type 440, and containing in addition more than 1 pct Mo.

The nickeliferous No. 4057 and Type 431 are virtually identical, but Germany lists no 12-2 analysis such as the American Type 414. The well-established series of three Type 440 steels in the American listing is represented by only one analysis in Germany, and that containing 1 pct Mo, also 0.1 pct V.

Regarding the Class II alloys, Germany apparently does not utilize an aluminum addition in the Type 410 analysis to prevent full hardening and thereby improve weldability in services where transformation stresses are advisably avoided—our Type 405. The grade containing several percent of aluminum, Type 406, would be listed in Germany under another classification.

U. S. and German 430 Types Vary

Type 430, one of the most prominent of all stainless steels in America, shows the following interesting contrasts with two corresponding German analyses: (a) titanium in proportions exceeding 7x pct C is added to both of the German steels; (b) one of these contains in addition nearly 2 pct Mo; (c) the chromium specifications of the German alloys allow no latitude at all in choosing ferrite-austenite proportions, while American practice allows freedom to choose a particular steel within this specification having strength at the cost of some corrosion resistance (low-chromium side),

TABLE II

CLASS II—FERRITIC

German Steel		AISI	Analysis in Pct of Weight					
No.	Name	No.	C	Cr	Mo	Mn	Si	Other Elements
4501	X8 Cr Ti 17	405	<0.08	11.5-13.5	.....	<1.00	<1.00	0.10-0.30 Al
		406	<0.15	12.0-14.0	.....	<1.00	<1.00	3.5-4.5 Al
		430	<0.12	14.0-18.0	.....	<1.00	<1.00	.....
		....	<0.10	17.0-18.0	.....	0.2-0.4	0.3-0.5	Ti >7 x Pct C
4523	X8 Cr Mo Ti 17	....	<0.10	16.5-17.5	1.6-1.9	0.2-0.4	0.3-0.5	Ti >7 x Pct C
		430-F	<0.12	14.0-18.0	.....	<1.25	<1.00	P, S, Se >0.07; Zr, Mo <0.60
4104	X12 Cr Mo S 17	....	0.10-0.15	16.0-17.0	0.2-0.3	0.2-0.4	0.3-0.5	0.15-0.25 S
		446	<0.35	23.0-27.0	.....	<1.50	<1.00	N <0.25
*4526	X12 Cr Mo Ti 25	....	<0.15	24.0-26.0	2.3-2.6	0.2-0.4	0.8-1.0	1.8-2.0 Ti

* Classified as special steels; the others are for general application.

TABLE III

CLASS III—AUSTENITIC

German Steel		AISI	Analysis in Pct of Weight						
No.	Name	No.	C	Cr	Ni	Mo	Mn	Si	Other Elements
4300	X12 Cr Ni 18-8	301	0.08–0.20	16.0–18.0	6.0– 8.0	.....	<2.00	<1.00	.....
		302	0.08–0.20	17.0–19.0	8.0–10.0	.....	<2.00	<1.00	.....
		....	<0.15	17.5–18.5	8.0– 9.0	.....	0.2–0.4	0.3–0.5	.....
		302-B	0.08–0.20	17.0–19.0	8.0–10.0	.....	<2.00	2.0–3.0	.....
4330	X8 Cr Ni Si 18-8	....	<0.10	17.5–18.5	8.0– 9.0	.....	0.2–0.4	1.5–2.5	.....
		303	<0.15	17.0–19.0	8.0–10.0	.....	<2.00	<1.00	P, S, Se >0.07; Zr, Mo <0.60
		304	<0.08	18.0–20.0	8.0–11.0	.....	<2.00	<1.00	.....
4301	X8 Cr Ni 18-9	....	<0.07	17.5–18.5	9.0–10.0	.....	0.2–0.4	0.3–0.5	.....
		308	<0.12	17.0–19.0	10.0–13.0	.....	<2.00	<1.00	.....
		308	<0.08	19.0–21.0	10.0–12.0	.....	<2.00	<1.00	.....
		309	<0.20	22.0–24.0	12.0–15.0	.....	<2.00	<1.00	.....
		310	<0.25	24.0–26.0	19.0–22.0	.....	<2.00	<1.50	.....
		314	<0.25	23.0–26.0	19.0–22.0	.....	<2.00	1.5–3.0	.....
		316	<0.10	16.0–18.0	10.0–14.0	2.0–3.0	<2.00	<1.00	.....
4401	X5 Cr Ni Mo 18-10	....	<0.07	17.5–18.5	10.0–11.0	1.8–2.2	0.2–0.4	0.3–0.5	.....
4571	X10 Cr Ni Mo Ti 18-10	....	<0.12	17.5–18.5	10.0–11.0	1.8–2.2	0.2–0.4	0.3–0.5	Ti >4 x Pct C
4580	X10 Cr Ni Mo Cb 18-10	....	<0.12	17.5–18.5	10.0–11.0	1.8–2.2	0.2–0.4	0.3–0.5	Cb >8 x Pct C
4413	X8 Cr Ni Mo Si 18-9	....	<0.10	17.5–18.5	9.0–10.0	1.8–2.2	0.2–0.4	2.0–2.5	.....
		317	<0.10	18.0–20.0	11.0–14.0	3.0–4.0	<2.00	<1.00	.....
*4449	X5 Cr Ni Mo 17-13	....	<0.07	16.5–17.5	12.5–13.5	4.5–5.0	0.2–0.4	0.3–0.5	.....
		321	<0.08	17.0–19.0	8.0–11.0	.....	<2.00	<1.00	Ti >5 x Pct C
4541	X10 Cr Ni Ti 18-9	....	<0.12	17.5–18.5	9.0–10.0	.....	0.2–0.4	0.3–0.5	Ti >4 x Pct C
		347	<0.08	17.0–19.0	9.0–12.0	.....	<2.00	<1.00	Cb >10 x Pct C
4550	X10 Cr Ni Cb 18-9	....	<0.12	17.5–18.5	9.0–10.0	.....	0.2–0.4	0.3–0.5	Cb >8 x Pct C
*4307	X8 Cr Ni 12-12	....	<0.10	12.0–13.0	11.5–12.5	.....	0.2–0.4	0.3–0.5	.....
*4211	X12 Mn Cr 18-10	....	<0.15	9.5–10.5	0.7– 0.9	0.4–0.6	17.0–19.0	0.3–0.5	.....
*4506	X5 Cr Ni Mo Cu 18-9	....	<0.07	17.0–18.0	17.0–18.0	1.8–2.2	0.2–0.4	0.3–0.5	1.8–2.2 Cu

* Classified as special steels; the others are for general application.

or corrosion resistance at the cost of some strength (high-chromium side); (d) carbon is kept a little lower in the German alloys because of the titanium addition; and (e) manganese and silicon contents are, as usual, lower in the German alloys.

The free-machining Type 430-F, produced in America with various free-machining additions as shown in Table II, is listed in Germany only for an addition of sulfur. Their carbon specification is also slightly different, setting a minimum at 0.10 pct and allowing additions somewhat higher than in American practice. Also, 0.25 pct Mo is added. Still further distinctions are essentially those given for the Type 430 analysis.

The high-chromium alloy, Type 446, commonly used in this country with no significant additions other than nitrogen for grain refining, is matched in Germany only by an alloy of considerably greater complexity. Their No. 4526: (a) has an addition of approximately 2 pct Ti, (b) contains 2.5 pct Mo, (c) has its silicon raised from the usual German 0.3 to 0.5 pct up towards 1 pct, (d) continues its low manganese level, in contrast to the augmented maximum of 1.5 pct in the American analysis, (e) restricts the carbon content to a maximum of 0.15 pct.

The table on Class III alloys is particularly interesting because of the important historical position of German metallurgists in the development of austenitic stainless steels.[1] The blanks in the German listing for our Types 308, 309, 310 and 314 should not be construed to mean an absence of similar compositions in Germany. Their comparable alloys would be listed elsewhere for heat-resisting applications.

U. S. Type 301 Not Used in Germany

The highly work-hardening Type 301 (17-7), having fairly wide usefulness in America, is not important in German practice. Their No. 4300, the analogue of our Type 302, is the popular 18-8 originally developed in Germany. Their current practice shows (a) a greater restriction in the respective ranges for carbon, chromium and nickel, (b) a generally lower silicon content, and (c) a considerably lower manganese content. This latter follows from their disregard for the effect of manganese on hot workability, also on austenite stability.

The German siliconized 18-8, No. 4330, is similar to AISI Type 302-B, differing in (a) the lower manganese content, (b) a lower carbon content, (c) a narrower specification for chromium, and (d) a lower limit on nickel. The German listing shows no analogue for America's popular free-machining grade, Type 303. Our 18-8 with specially low carbon—Type 304, also "ELC"—is closely matched by the German No. 4301, differing only in manganese and silicon contents, and in closer specifications on chromium and nickel.

A free-spinning analysis, similar to our Type 305, does not appear in the German listing. It is likely that the shortage of nickel in that country hinders the usefulness of an alloy

whose low rate of work-hardening is largely the result of an aggravated nickel content.

Mo Abundant in German Class III's

Molybdenum, abundantly added to German stainless steels, appears in a particularly large number of their Class III modifications. The basic analysis of most of these rather closely approaches Type 316. The distinctions are: (a) closer specifications for all additions, (b) molybdenum on the low side near 2.0 pct (a practice also used by some in America), (c) a lower manganese content, (d) considerably lower nickel maximums, (e) lower silicon contents, except in No. 4413, which is a specially siliconized grade. The additions of titanium and columbium to Nos. 4571 and 4580 correspond to American practice for nonstandardized modifications of Type 316, except that the titanium and columbium to carbon ratio is greater in this country. The very low maximum of 0.07 pct C in No. 4401 warrants some attention.

Alloys of higher molybdenum content, such as our Type 317, are represented in Germany by No. 4449, which allows one of the highest nickel additions in any of their grades. Compared to Type 317, their steel has a higher molybdenum content, a lower carbon maximum, less chromium, and the usual lower manganese and silicon contents. Stabilized austenites containing titanium and columbium, analagous to our Types 321 and 347, show as their principal difference a slightly higher carbon maximum and a lower ratio of stabilizing element to total carbon content. Nickel contents are also lower, as well as manganese and silicon.

Two German Special Grades Popular

Among the special grades produced as standard stainless steels in Germany, two of them are virtually without analogue in this country. No. 4307 is the 12-12 analysis generally popular abroad, but receiving little attention over here. Their No. 4211 is the only high-manganese analysis on the postwar listing. Compare this with the listing in Table II. The chromium content of this alloy actually falls below the minimum required for "stainless" behavior in most service. Their No. 4595 is the elaborate molybdenum-copper Class III steel, comparable to some of the nonstandard grades studied in this country by Climax Molybdenum Co. This resembles Carpenter No. 20, except for the lower nickel analysis of the German steel.

TABLE IV

NONSTANDARD GERMAN GRADES

C	Cr	Ni	Mo	Mn	N
0.07	20	5.0	.....	.....	0.25
0.07	20	5.5	1.2	.....	0.25
0.07	20	6.0	2.2	.....	0.25
0.10	15	1.5	.....	8	0.10
0.10	15	1.5	.....	14	0.10
0.10	19	1.5	.....	9	.....
0.10	20	1.5	.....	9	0.20

In place of previous common chemical means, the Germans are now strongly leaning toward electrochemical methods for quantitative measurement of activation and passivation behavior. The process is essentially the one developed by Hittorf in that country half a century ago, involving measurement of anodic current density v. potential. The procedure, now adopted by Krupp, discloses three ranges of behavior; (1) normally active, (2) passivated, and (3) depassivated (breakdown of passivation). The data allow excellent systematization of both reagents and steels, with some particularly interesting results for H_2SO_4.

Study Stress-corrosion Cracking

During recent years, the phenomenon of stress-corrosion cracking has attracted attention in both countries.[4] German metallurgists relate stress-corrosion cracking to stability of austenite, more stable alloys being less sensitive. They find that coldworking decreases the corrosion-cracking resistance of stable austenite, but may actually increase that of unstable austenite—through electrochemical protection afforded by precipitated martensite. In their opinion, the intracrystalline phenomenon of stress-corrosion cracking has no relationship to sensitization. They find that Class II steels are also subject to the defect, but that the level of stress necessary for the phenomenon is too high to allow it to become important for most operating conditions.

Phosphorous has been found to counteract sensitization, probably because of its ferritizing tendency; but the observation has not resulted in any commercial application. Vanadium has been found to be ineffective as a carbide stabilizer, an addition as high as 25 pct still showing no inhibition of sensitization. Similar to opinions expressed in this country, particularly by Uhlig and Wulff, German metallurgists believe that pit corrosion does not necessarily relate to inclusions or visible inhomogeneities within the steel, but that it is a function of more subtle factors.

References

[1] *C. A. Zapffe, "Who Discovered Stainless Steel?" THE IRON AGE, Oct. 14, 1948, p. 120.*

[2] *A. L. Field, "German Stainless Steel," THE IRON AGE, Dec. 20, 1945, p. 60.*

[3] *Metals and Alloys, July, 1943, p. 55.*

[4] *ASTM-AIME Symposium on Stress-Corrosion Cracking, 1944.*

Three multiple-station automatic machines have increased output per manhour by more than 150 pct in machining Ford carburetor diecastings. On one casting, two machines do work which formerly required five machines and five operators. Savings in floor space, materials handling and labor costs result.

AUTOMATICS machine diecastings 150 pct faster

By HERBERT CHASE
Consultant, Forrest Hills

Complete revision of the machining lineup on the two major zinc alloy diecastings used in Ford carburetors has increased output per manhour by more than 150 pct at the Milford, Mich., plant of Ford Motor Co. These two castings are the main body and its mating air horn.

Formerly, the body machining required a row of five machines each having its own operator. Total output of the five machines was 1800 per 8-hr day. Now two machines, one 12-station and one 8-station, with one operator each, process 1600 carburetor bodies in 8 hr. A similar machine having 12 stations handles corresponding operations on the air horn. All three of the new machines are Morris vertical center column types in which most of the tools are supported from a common main head. These tools are lifted vertically before indexings occur and then are fed down simultaneously for the next set of operations. In some cases side or angle tools are also used.

Several Faces Can Be Machined

Each machine has one fixture per station. Each fixture is unloaded and reloaded and the workpiece is clamped by hand at the front station. It then progresses around horizontally, stopping at each successive station and finally returning to the front station with all machining except light burring completed. During some of the indexings, the fixtures are turned to bring a new portion of the casting in line with the tools. As a result, machining can be done on two sides, one end, and on top and bottom faces.

Where side heads are required, the tools in these are actuated by inter-connection with the main head of the machine, being fed inward as the latter feeds down and retracting when the main head retracts. Thus, all tools in effect are interlocked. Their motion depends upon that of the main head, which is raised between indexings and is lowered as the tools are fed into the workpieces at each machining station.

In indexing to the first working station in the first Morris machine, the fixture is turned 90°, as can be seen in Fig. 1. The table indexes automatically when the locking wrench is drawn back.

Some Heads Utilize High-Speed Motors

At station No. 2, the first working station on the 12-station machine, the pump chamber outlet hole is produced with a No. 40 drill. Four 8-32 and five 10-32 screw holes are also tapped using a multiple reversing tapping head. Another 10-32 holes is tapped at station No. 3, a No. 41 gun drill produces a pump outlet crosshole and a No. 28 drill, fed in by a high-speed angular head, drills an economizer hole to depth.

A pump rod hole is reamed and counterbored at station No. 4. Also at this station an econo-

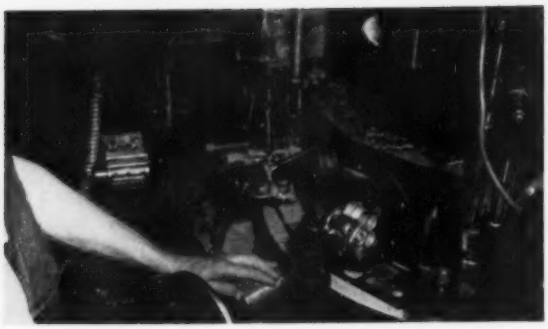


FIG. 1—Locking a body casting in a fixture at the loading station of a 12-station Morris machine. In left background is first working station. During indexing fixture has rocked 90° to bring up proper face for machining at this station. Indexing occurs automatically when locking tool is retracted.

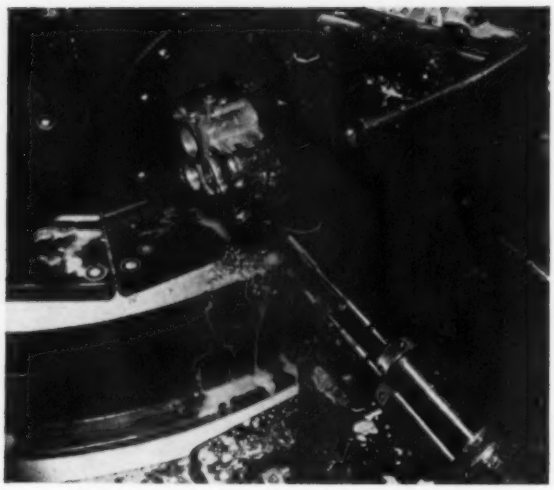


FIG. 2—Though most tools are mounted on the main vertical slide, these machines use some side heads. At this station, two stepped taps are driven by side heads.

FIG. 3—The final operation on the first machine handling body diecastings includes these tools: a step reamer, two inserted-blade reamers, and a rotary file or burring tool. The latter tool, given a compound motion by a cam, burrs an internal surface.

mizer body and two ejector pin marks are spot-faced and two No. 1 drills break out flash for throttle body screw holes. At station No. 5, cross drilling is done with one No. 41 drill fed to depth on a hole leading to the pump discharge and a step drill is applied to metering jet holes. A No. 59 drill, driven at 10,000 rpm by a high speed motor, produces an economizer metering hole.

Step drilling of a piston pump discharge hole and producing a pickup hole with a No. 90 drill is done at station No. 6. Then, at station No. 7, comes cross drilling with a No. 28 drill, to produce an economizer hole to depth, in an angular head. Spot-facing of two ejector pin marks, tapping of an economizer hole and a throttle body screw hole, are the operations at station No. 8.

Step Drills And Taps Used

At station No. 9 comes drilling of an economizer metering hole with a No. 59 drill in an angular head and drilling a No. 30 hole through the piston pump chamber. Then, at station No. 10, two No. 40 drills are used to clean out idler passage holes and two drills clean out the idler jet holes. Also used is a step drill for a pump chamber inlet hole, and a ball check seat is produced with a No. 50 drill.

At station No. 11 two step taps, Fig. 2, are used at main jet holes to produce threads for jet plugs. A No. 40 drill also makes a pickup hole.

Step reaming is done on pump chamber holes and two venturi holes are reamed at station No. 12, Fig. 3. Also used at this station is a rotary filer or burring tool. This tool is given a compound motion by a cam, first feeding down through a clearance hole, then radially part way into a side hole, and then vertically again to burr edges at the hole intersection. These motions are reversed in withdrawing the tool.

Machining Completed On Second Machine

After inspection, body castings go to the 8-station Morris machine to perform operations at points not accessible in the 12-station setup. After loading at station No. 1 of the second machine and indexing to station No. 2, a form or step drill is applied. At its end is a countersink. This tool is guided by a roller bearing bushing. Then, at station No. 3, a No. 42 drill starts a hole. At station No. 4 a drill in a horizontal head produces a hole and a vertical head using a step-drill produces another hole and counterbores it part way.

Station No. 5 includes burring from a horizontal head and use of a No. 42 gun drill in a

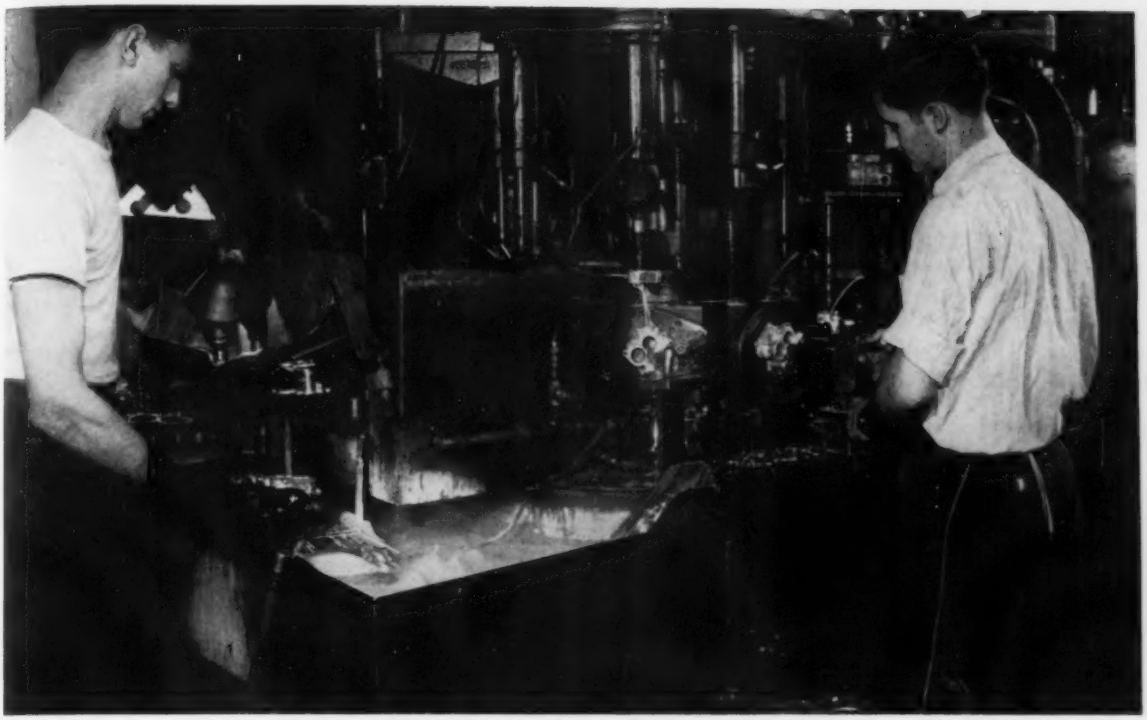


FIG. 4—At the loading station of the 8-station automatic, the operator on the right loads and unloads the fixtures. Finished castings go into the cleaning tank, from which the operator on the left removes them and blows them out with an air hose.

vertical head. Then, at station No. 6, a No. 42 drill is fed to depth to hold a 1.400-in. dimension. A No. 56 gun drill is used at station No. 7 to produce a hole for vacuum takeoff. At the final station in this machine, a ⅜-24 tap and a No. 42 drill in an angular head tap a hole and do burring operation respectively.

Castings Washed And Chromated

When the operator removes the casting, he places it in a chute and it slides into a hot washing solution from which it is taken by another operator, shown at the left in Fig. 4, who uses a jet of air to blow out the casting. All burring and inspection are done here. The casting is then ready for transfer to a tank in which the castings are given a chromate treatment designed to inhibit formation of white oxide, in case water in gasoline, used in service, is allowed to stand in contact with the casting.

Machining of the air horn is handled in the second 12-station Morris machine. Castings, loaded at station No. 1, are locked to the fixtures by a hand crank and after indexing to the second station come under a tool. Of the six blades in this cutter, three machine a 30° chamfer at the top of air horn, one spot-faces a 2.25-in. diam on the top, one faces a step outside the horn, and one makes an outside bevel.

One Station Not Used

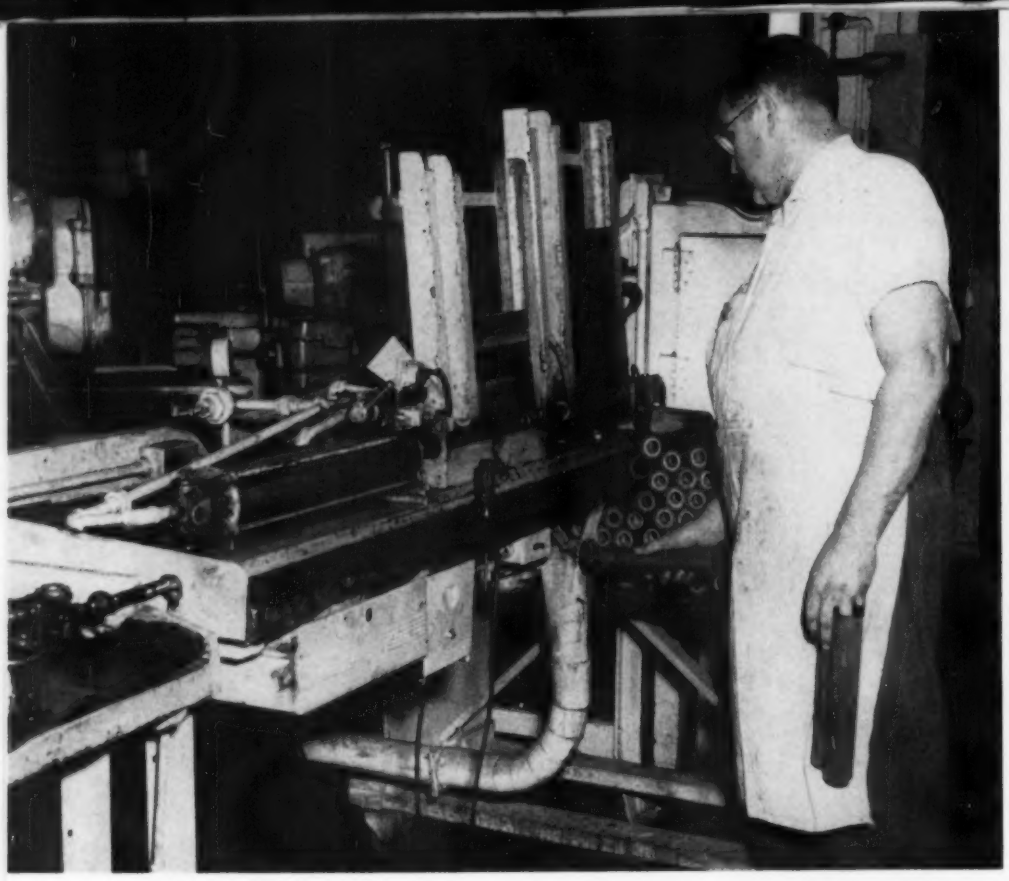
Drilling the air vent tube is done at station No. 3. Station No. 4 is open. But at station No. 5, a form drill and spot-facer produce a 0.264 to 0.270-in. diam hole, a 36° included angle bevel of 0.452 to 0.458 in. diam. Also, a 90° countersink chamfers for a tap at the 0.452-in. diam. Five No. 9 drills at station No. 6 break away flash in five cored holes for the screws that fasten the horn to the body.

Tapping of one 5/16-24 thread for the fuel needle valve seat is done at station No. 7 and is followed at the next station by drilling a No. 41 hole in one ear for the float hinge pin. One 10-32 hole for a choke lever screw is tapped at this station. The hole for a float hinge pin is then drilled in the second ear at station No. 9, where also a reamer in a floating holder line reams the shaft hole.

Burring Is Only Other Machining Needed

A spot-facer at station No. 10 removes flash at a sector pin boss. Two ⅜-in. diam spot-facers clean off areas at the ejector at station No. 11. The final operation is the tapping of one inlet hole at the 12th station. Machined castings, as they are unloaded, are placed in a chute and fall into a hot wash from which they are removed, burred, inspected and placed on a conveyer. Degreasing is done before castings go to the chromic acid dip.

Machining of both castings, the body in two machines and the air horn in one, is thus virtually completed except for inspection. Both require some minor deburring which is done by hand, with high-speed tools.



AS LONG as its two magazines are kept filled, this air-operated press assembles magnesium tubes inside lengths of rubber tubing by itself, at a rate of 1000 to 1200 an hour. These subassemblies are used in IBM electric typewriters.

Assembles over 1000 typewriter units an hour

By replacing a hand-controlled press with semi-automatic, air-operated equipment of their own design, International Business Machines Corp., Poughkeepsie, N. Y., are now assembling power rolls for their electric typewriters at a rate of 1000 to 1200 an hour. This subassembly, similar to the platen in a regular typewriter, is made of thick-walled rubber with a tubular magnesium core. After being coated with rubber cement and allowed to dry, the core must be pressed into the thick-walled rubber tube. The latter then constitutes the friction driving surface of the roll.

When this job was done in a hand-controlled vertical press, it was a rather slow operation. Now the operator has only two duties to perform. One, he must keep the magazines feeding the new press filled. Two, the operator must chamfer the inner diameter of one end of each rubber tube before placing it in the press' magazine. For this purpose, the operator holds the tubing against a motor-driven grinding wheel installed just below bench level. A suction fan draws off the rubber particles.

As the magnesium tubes slide down the nearest of the two magazines in the illustration, the lowest one lines up with the ram of an air cylinder. At the same time, a rubber tube has also dropped into position, with its chamfered hole ready to receive the magnesium core. With both components lined up, the air ram advances and pushes the metal tube into the rubber one.

The second air ram, which is connected to the cradle holding the now-completed assembly, cannot be seen in the illustration. As soon as the metal tube's end is flush with that of its rubber container, a limit switch is tripped automatically. A solenoid then shifts the two air valves, causing air to return the longitudinal ram to its original position and advancing the transverse ram. This causes the cradle to upset and the sub-assembly rolls out into a holder. As soon as this second ram returns to position, the cradle rocks back and another rubber tube falls into it.

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LIGHT METALS *and their alloys* CODIFIED

The confusion caused by varying designations for light metal alloys is on its way out. This new, uniform system is now officially adopted by ASTM. It will be combined with the temper designations in use since 1948.

The light metals industry has long sought an adequate system for codification of light metals and alloys, cast and wrought. Each producer has his own alloy nomenclature, resulting in use of many different designations for the same alloy. This makes it difficult to specify light metals and alloys without reference to the many commercial designations. It also presents a problem in the writing of specifications, for it is usually impractical to list all of the trade designations. The American Society for Testing Materials has been concerned with this difficulty for many years.

A system for codification of aluminum and aluminum-base alloys in ASTM specifications was adopted[1] in 1942 and modified[2] in 1945. For magnesium and magnesium-base alloys a somewhat different system was adopted[3] in 1944 and modified[4] in 1946. In both systems[5] letters designated alloying elements in the alloy. Nu followed the letters to indicate the total nu of alloying elements in aluminum alloys an percentage of each designated alloying ele in magnesium alloys. These codification sys were not considered entirely satisfactory, several unsuccessful attempts[6] were mad change them. They were changed, howeve 1949 when a single system was adopted for metals and alloys.

The new codification system is being us designate aluminum and magnesium and alloys in the latest issues of ASTM spec tions. It is also used for the commercial des tions of some new magnesium alloys which not yet been incorporated into ASTM specs.

TABLE I

ELEMENTS CODED

A — Aluminum	J — Phosphorus	R — Chromium
B — Bismuth	K — Zirconium	S — Silicon
C — Copper	L — Beryllium	T — Tin
D — Cadmium	M — Manganese	V — Arsenic
E — Cerium	N — Nickel	W — Sulfur
F — Iron	P — Lead	Y — Antimony
G — Magnesium	Q — Silver	Z — Zinc

TABLE II

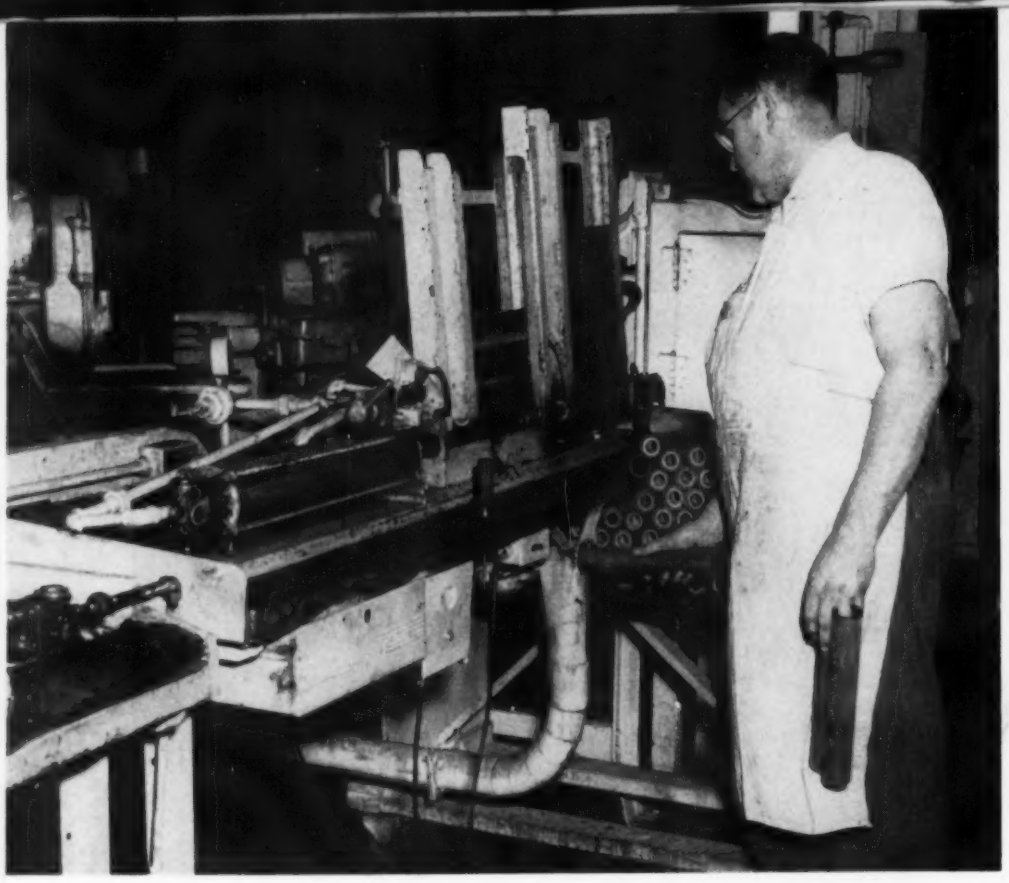
MAGNESIUM ALLOY ANALYSIS

Aluminum	2.5 to 3.5
Manganese	0.20 min.
Zinc	0.6 to 1.4
Silicon	0.3 max.
Copper	0.05 max.
Nickel	0.005 max.
Iron	0.005 max.
Calcium	0.3 max.
Other impurities	0.3 max.

Coded By Alloying Element

Under this codification system, the des tions for light metals and alloys are based o chemical composition limits for the metal loy. In the system, an alloying element fined as an element contained in the base within a specified range or in excess of a fied minimum percentage. The amount pr is determined by the mean of the rang minimum percentage) before rounding off. designation for an alloy in ingot form for ings is the same as that assigned the same in the form of castings, even though the position may not be identical.

Designations for light alloys consist more than two letters representing the al elements specified in the greatest amount. are arranged in order of decreasing percen or in alphabetical order if of equal percen They are followed by the respective percen rounded off to whole numbers. A final le



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LIGHT METALS *and their alloys* CODIFIED

The confusion caused by varying designations for light metal alloys is on its way out. This new, uniform system is now officially adopted by ASTM. It will be combined with the temper designations in use since 1948.

The light metals industry has long sought an adequate system for codification of light metals and alloys, cast and wrought. Each producer has his own alloy nomenclature, resulting in use of many different designations for the same alloy. This makes it difficult to specify light metals and alloys without reference to the many commercial designations. It also presents a problem in the writing of specifications, for it is usually impractical to list all of the trade designations. The American Society for Testing Materials has been concerned with this difficulty for many years.

A system for codification of aluminum and aluminum-base alloys in ASTM specifications was adopted[1] in 1942 and modified[2] in 1945. For magnesium and magnesium-base alloys a somewhat different system was adopted[3] in 1944 and modified[4] in 1946. In both systems[5] letters designated alloying elements in the alloy. Numbers followed the letters to indicate the total number of alloying elements in aluminum alloys and the percentage of each designated alloying element in magnesium alloys. These codification systems were not considered entirely satisfactory, and several unsuccessful attempts[6] were made to change them. They were changed, however, in 1949 when a single system was adopted for light metals and alloys.

The new codification system is being used to designate aluminum and magnesium and their alloys in the latest issues of ASTM specifications. It is also used for the commercial designations of some new magnesium alloys which have not yet been incorporated into ASTM specs.

TABLE I

ELEMENTS CODED

A — Aluminum	J — Phosphorus	R — Chromium
B — Bismuth	K — Zirconium	S — Silicon
C — Copper	L — Beryllium	T — Tin
D — Cadmium	M — Manganese	V — Arsenic
E — Cerium	N — Nickel	W — Sulfur
F — Iron	P — Lead	Y — Antimony
G — Magnesium	Q — Silver	Z — Zinc

TABLE II

MAGNESIUM ALLOY ANALYSIS

Aluminum	2.5 to 3.5
Manganese	0.20 min.
Zinc	0.6 to 1.4
Silicon	0.3 max.
Copper	0.05 max.
Nickel	0.005 max.
Iron	0.005 max.
Calcium	0.3 max.
Other impurities	0.3 max.

Coded By Alloying Element

Under this codification system, the designations for light metals and alloys are based on the chemical composition limits for the metal or alloy. In the system, an alloying element is defined as an element contained in the base metal within a specified range or in excess of a specified minimum percentage. The amount present is determined by the mean of the range (or minimum percentage) before rounding off. The designation for an alloy in ingot form for castings is the same as that assigned the same alloy in the form of castings, even though the composition may not be identical.

Designations for light alloys consist of not more than two letters representing the alloying elements specified in the greatest amount. These are arranged in order of decreasing percentages, or in alphabetical order if of equal percentages. They are followed by the respective percentages rounded off to whole numbers. A final letter is

TABLE III

Aluminum and Aluminum-base Alloys

Alloy Designations — CHEMICAL COMPOSITION LIMITS—Pct — ASTM Specifications[1]

ASTM	Commercial		Silicon Min	Silicon Max	Iron Max	Copper Min	Copper Max	Manganese Min	Manganese Max	Magnesium Min	Magnesium Max	Chromium Min	Chromium Max	Nickel Min	Nickel Max	Zinc Min	Zinc Max	Tin Max	Lead Min	Lead Max	Bismuth Min	Bismuth Max	Titanium Min	Titanium Max	Others Each Max	Others Total Max	Aluminum Min	B24	B26	B37	B85	B108	B178	B179	B209	B210	B211	B221	B234	B235	B241	B247
850A							8.0				2.5						2.05									15.0[2]	85.0			★												
900A							4.5				2.0						2.0									10.0[2]	90.0			★												
920A							4.5				1.0						1.0									8.0[2]	92.0			★												
950A							2.5				1.0						1.0									5.0[2]	95.0			★												
980A							0.2				0.5						0.2									2.0[2]	98.			★												
990A	2S			1.0 Si	+ Fe		0.20		0.10								0.10								0.05	0.15	99.0						★		★		★	★				★
9930A				0.30	0.50		0.10				0.05														0.05	0.70	99.3	★														
996A	99.6			0.4 Si	+ Fe		0.05																		0.05	0.15	99.6						★									
9975A	99.75			0.10	0.20		0.05				0.03														0.03	0.25[2]	99.75	★														
C4A	195			1.5	1.0	4.0	5.0		0.3		0.03						0.3							0.2	0.05	0.15	Remainder		★													
			0.5	1.5	0.8	4.0	5.0		0.3		0.03						0.3							0.2	0.05	0.15	Remainder							★								
CB60A[6]	11S			0.40	0.70	5.0	6.0										0.30		0.2	0.6	0.2	0.6			0.05	0.20	Remainder										★					
CG42A	24S			0.50	0.50	3.8	4.9	0.30	0.90	1.2	1.8		0.10[3]				0.10								0.05	0.15	Remainder								★	★	★	★			★	
Clad CG42A	Clad 24S	Core		0.50	0.50	3.8	4.9	0.30	0.90	1.2	1.8		0.25				0.10								0.05	0.15	Remainder[5]								★							
		Clad		0.70 Si	+ Fe		0.10		0.05								0.10								0.05	0.15	99.3								★							
CG100A	122			2.0	1.5	9.2	10.8		0.5	0.15	0.35				0.3		0.5							0.2		0.3	Remainder		★			★										
				2.0	1.2	9.2	10.8		0.5	0.20	0.35				0.3		0.4							0.2		0.3	Remainder							★								
CM41A	17S			0.80	1.0	3.5	4.5	0.4	1.0	0.2	0.8		0.25				0.10								0.05	0.15	Remainder										★					
CM41B	R317			1.0	1.0	3.5	4.5	0.4	1.0	0.2	0.8		0.25				0.10		0.3	0.7	0.3	0.7			0.05	0.15	Remainder										★					
CN42A	142			0.7	1.0	3.5	4.5		0.3	1.2	1.8		0.2	1.7	2.3		0.3							0.2	0.05	0.15	Remainder		★			★										
				0.7	0.8	3.5	4.5		0.3	1.3	1.8		0.2	1.7	2.3		0.3							0.2	0.05	0.15	Remainder							★								
CN42C	18S			0.90	1.0	3.5	4.5		0.20	0.45	0.90		0.10	1.7	2.3		0.25							0.05	0.05	0.15	Remainder															★
CN42D	B18S			0.90	1.0	3.5	4.5		0.20	1.2	1.8		0.10	1.7	2.3		0.25							0.05	0.05	0.15	Remainder															★
CS41A	14S		0.5	1.2	1.0	3.9	5.0	0.4	1.2	0.2	0.8		0.10				0.25							[4]	0.05	0.15	Remainder										★	★		★		★
Clad CS41A	Clad 14S, Clad R301	Core	0.5	1.2	1.0	3.9	5.0	0.40	1.2	0.20	0.80		0.25				0.25								0.05	0.15	Remainder								★							
		Clad	0.35	1.0	0.60		0.10		0.75	0.80	1.5		0.35				0.20							0.10	0.05	0.15	Remainder								★							
CS41C	25S		0.50	1.2	1.0	3.9	5.0	0.40	1.2		0.05		0.10				0.25							0.15	0.05	0.15	Remainder															★
CS42A	B195		2.0	3.0	1.2	4.0	5.0		0.3		0.05				0.3		0.3							0.2		0.3	Remainder					★										
			2.0	3.0	1.0	4.0	5.0		0.3		0.05				0.3		0.3							0.2		0.3	Remainder							★								
CS43A	108		2.5	3.5	1.2	3.5	4.5		0.5		0.05				0.3		1.0							0.2		0.5	Remainder		★													
			2.5	3.5	1.0	3.5	4.5		0.5		0.05				0.3		1.0							0.2		0.5	Remainder							★								
CS66A	152 Type		5.0	6.0	1.5	5.5	7.5		0.8	0.2	0.6						0.8							0.2		0.8	Remainder					★										
			5.0	6.0	1.2	5.5	7.5		0.8	0.2	0.4						0.8							0.2		0.8	Remainder							★								

CS72A	113	...	1.0	4.0	1.4	6.0	8.0	...	0.5	...	0.07	...	...	...	0.3	...	2.5	...	...	...	...	...	...	0.2	...	0.5	Remainder		★			★										
		...	1.0	4.0	1.2	6.0	8.0	...	0.5	...	0.07	...	...	...	0.3	...	2.5	...	...	...	...	...	...	0.2	...	0.5	Remainder							★								
CS104A	138 Type	...	3.5	4.5	1.5	9.0	11.0	...	0.5	0.5	1.5	...	...	...	1.0	...	0.5	...	...	...	...	...	...	0.2	...	0.5	Remainder					★										
		...	3.5	4.5	1.2	9.0	11.0	...	0.5	0.5	1.5	...	...	...	1.0	...	0.5	...	...	...	...	...	...	0.2	...	0.5	Remainder							★								
G1A	B50S, C50S, 150S	...	...	0.50	0.80	...	0.25	...	0.15	1.0	1.8	...	0.10	...	...	...	0.25	...	...	...	...	...	...	...	0.05	0.13	Remainder						★		★							
G4A	214	...	...	0.3	0.5[6]	...	0.1[6]	...	0.3[6]	3.5	4.5	...	...	...	...	...	0.1	...	...	...	...	...	...	0.2	0.05	0.15	Remainder		★													
		...	...	0.3	0.4	...	0.1	...	0.3	3.5	4.5	...	...	...	...	...	0.1	...	...	...	...	...	...	0.2	0.05	0.15	Remainder							★								
(G2)[6] G8A	218	...	...	0.3	1.8	...	0.2	...	0.3	7.5	8.5	...	...	...	0.1	...	0.1	0.1	...	...	...	...	...	...	...	0.2	Remainder				★											
		...	...	0.3	0.8	...	0.2	...	0.3	7.5	8.5	...	...	...	0.1	...	0.1	0.1	...	...	...	...	...	...	...	0.2	Remainder							★								
G10A	220	...	...	0.2	0.3	...	0.2	...	0.1	9.5	10.6	...	...	...	...	...	0.1	...	...	...	...	...	...	0.2	0.05	0.15	Remainder		★													
		...	...	0.2	0.2	...	0.2	...	0.1	9.5	10.6	...	...	...	...	...	0.1	...	...	...	...	...	...	0.2	0.05	0.15	Remainder							★								
GR20A	52S	...	...	0.45 Si + Fe		...	0.10	...	0.10	2.2	2.8	0.15	0.35	...	...	...	0.20	...	...	...	...	...	...	...	0.05	0.15	Remainder						★		★	★	★					
GS10A	63S	...	0.2	0.6	0.50	...	0.10	...	0.10	0.45	0.85	...	0.10	...	...	...	0.10	...	...	...	...	...	...	0.10	0.05	0.15	Remainder											★		★	★	
GS11A	61S	...	0.40	0.80	0.70	0.15	0.40	...	0.15	0.80	1.2	0.15	0.35	...	...	...	0.20	...	...	...	...	...	...	0.15	0.05	0.15	Remainder						★		★	★	★	★		★	★	★
GS11B	53S	...	45-65% of Mg		0.35	...	0.10	...	...	1.1	1.4	0.15	0.35	...	...	...	0.10	...	...	...	...	...	...	0.15	0.05	0.15	Remainder											★				★
GS42A	B214	...	1.4	2.2	0.6	...	0.3	...	0.8	3.5	4.5	...	0.2	...	...	...	0.3	...	...	...	...	...	...	0.2	0.05	...	Remainder		★			★										
		...	1.4	2.2	0.5	...	0.3	...	0.8	3.5	4.5	...	0.2	...	...	...	0.3	...	...	...	...	...	...	0.2	0.05	0.15	Remainder							★								
GZ42A	A214	...	...	0.3	0.6	...	0.3	...	0.8	3.5	4.5	...	...	...	...	1.4	2.2	...	...	...	...	...	...	0.2	0.05	...	Remainder		★			★										
		...	...	0.3	0.3	...	0.1	...	0.3	3.5	4.5	...	...	...	...	1.4	2.2	...	...	...	...	...	...	0.2	0.05	0.15	Remainder							★								
M1A	3S	...	...	0.60	0.70	...	0.20	1.0	1.5	...	...	...	...	...	...	...	0.10	...	...	...	...	...	...	...	0.05	0.15	Remainder						★		★	★		★	★	★	★	★
Clad M1A	Clad 3S	Core	...	0.60	0.70	...	0.20	1.0	1.5	...	...	...	...	...	...	...	0.10	...	...	...	...	...	...	...	0.05	0.15	Remainder												★			
		Clad	...	0.60 Si + Fe		...	0.10	...	0.10	...	...	...	...	...	...	0.75	1.5	...	...	...	...	...	...	...	0.05	0.13	Remainder												★			
MG11A	4S	...	...	0.30	0.70	...	0.20	1.0	1.5	0.8	1.3	...	...	...	...	...	0.10	...	...	...	...	...	...	...	0.05	0.15	Remainder						★		★	★						
S5A	13	...	4.5	6.0	0.8	...	0.1	...	0.3	...	0.05	...	...	...	...	...	0.3	...	...	...	...	...	...	0.2	0.05	...	Remainder		★			★										
		...	4.5	6.0	0.6	...	0.1	...	0.3	...	0.05	...	...	...	...	...	0.3	...	...	...	...	...	...	0.2	0.05	...	Remainder							★								
S5B	43 Type	...	4.5	6.0	0.8	...	0.3[7]	...	0.3	...	0.05	...	0.2	...	...	...	0.3	...	...	...	...	...	...	0.2	...	0.3	Remainder		★			★										
		...	4.5	6.0	0.6	...	0.3	...	0.3	...	0.05	...	0.2	...	...	...	0.3	...	...	...	...	...	...	0.2	...	0.3	Remainder							★								
(S4)[6] S5C	43	...	4.5	6.0	2.0	...	0.6	...	0.3	...	0.1	...	...	...	0.5	...	0.5	0.1	...	...	...	...	...	...	...	0.2	Remainder				★											
		...	4.5	6.0	0.8	...	0.6	...	0.3	...	0.1	...	...	...	0.5	...	0.5	0.1	...	...	...	...	...	...	...	0.2	Remainder							★								
(S5)[6]	13	...	11.0	13.0	2.0	...	0.6	...	0.3	...	0.1	...	...	...	0.5	...	0.5	0.1	...	...	...	...	...	...	...	0.2	Remainder				★											
(S9)[6]		...	11.0	13.0	1.3	...	0.6	...	0.3	...	0.1	...	...	...	0.5	...	0.5	0.1	...	...	...	...	...	...	...	0.2	Remainder				★											
S12A	13	...	11.0	13.0	0.8	...	0.6	...	0.3	...	0.1	...	...	...	0.5	...	0.3	0.1	...	...	...	...	...	...	...	0.2	Remainder							★								
SC51A	355	...	4.5	5.5	0.8	1.0	1.5	...	0.5	0.4	0.6	...	0.2	...	...	...	0.3	...	...	...	...	...	...	0.2	0.05	0.15	Remainder		★			★										
		...	4.5	5.5	0.6	1.0	1.5	...	0.5	0.4	0.6	...	0.2	...	...	...	0.3	...	...	...	...	...	...	0.2	0.05	0.15	Remainder							★								
(SC2)[6] SC54A	85	...	4.5	5.5	2.0	3.0	4.0	...	0.5	...	0.1	...	...	...	0.5	...	1.0	0.3	...	...	...	...	...	...	...	0.5	Remainder				★											
		...	4.5	5.5	0.8	3.0	4.0	...	0.5	...	0.1	...	...	...	0.5	...	0.9	0.3	...	...	...	...	...	...	...	0.5	Remainder							★								
(SC5)[6] SC54B	85 Type	...	4.5	5.5	1.3	3.0	4.0	...	0.5	...	0.1	...	...	...	0.5	...	1.0	0.3	...	...	...	...	...	...	...	0.5	Remainder				★											
		...	4.5	5.5	0.8	3.0	4.0	...	0.5	...	0.1	...	...	...	0.5	...	0.5	0.3	...	...	...	...	...	...	...	0.5	Remainder							★								
SC64A	A108	...	5.0	6.0	1.0	4.0	5.0	...	0.5	...	0.1	...	...	...	...	...	1.0	...	...	...	...	...	...	0.2	...	0.5	Remainder					★										
		...	5.0	6.0	0.8	4.0	5.0	...	0.5	...	0.1	...	...	...	...	...	1.0	...	...	...	...	...	...	0.2	...	0.5	Remainder							★								

Table continued on next page

Continued

ASTM	Commercial		Silicon Min	Silicon Max	Iron Max	Copper Min	Copper Max	Manganese Min	Manganese Max	Magnesium Min	Magnesium Max	Chromium Min	Chromium Max	Nickel Min	Nickel Max	Zinc Min	Zinc Max	Tin Max	Lead Min	Lead Max	Bismuth Min	Bismuth Max	Titanium Min	Titanium Max	Others Each Max	Others Total Max	Aluminum Min	B24	B26	B37	B85	B108	B178	B179	B209	B210	B211	B221	B234	B235	B241	B247
SC64B	Allcast	...	5.5	7.0	1.0	3.3	4.3	...	0.5	...	0.1	...	...	...	0.3	...	1.0	...	...	...	...	...	...	0.2	...	0.5	Remainder		*			*										
		...	5.5	7.0	0.8	3.3	4.3	...	0.5	...	0.1	...	...	...	0.3	...	1.0	...	...	...	...	...	...	0.2	...	0.5	Remainder							*								
SC64C	319	...	5.5	7.0	1.2	3.0	4.5	...	0.8	...	0.5	...	...	...	0.5	...	1.0	...	...	...	...	...	...	0.2	...	0.5	Remainder		*			*										
		...	5.5	7.0	1.0	3.0	4.5	...	0.8	...	0.5	...	...	...	0.5	...	1.0	...	...	...	...	...	...	0.2	...	0.5	Remainder							*								
SC82A	Red X-8	...	7.0	8.6	1.0	1.0	2.0	0.2	0.6	0.2	0.6	...	0.3	...	0.2	...	1.0	...	...	...	...	...	...	0.3	...	0.5	Remainder		*													
		...	7.0	8.6	0.8	1.0	2.0	0.2	0.6	0.2	0.6	...	0.3	...	0.2	...	1.0	...	...	...	...	...	...	0.2	...	0.5	Remainder							*								
(SC8)[6] SC84A	A380	...	7.5	9.5	1.3	3.0	4.0	...	0.5	...	0.1	...	...	...	0.5	...	1.0	...	0.3	...	...	...	...	...	...	0.5	Remainder				*											
		...	7.5	9.5	0.8	3.0	4.0	...	0.5	...	0.1	...	...	...	0.5	...	0.5	...	0.3	...	...	...	...	...	...	0.5	Remainder							*								
(SC7)[6] SC84B	380	...	7.5	9.5	2.0	3.0	4.0	...	0.5	...	0.1	...	...	...	0.5	...	1.0	...	0.3	...	...	...	...	...	...	0.5	Remainder				*											
		...	7.5	9.5	0.8	3.0	4.0	...	0.5	...	0.1	...	...	...	0.5	...	0.9	...	0.3	...	...	...	...	...	...	0.5	Remainder							*								
SC122A	Red X-13	...	11.0	13.0	0.9	1.0	2.0	0.5	0.9	0.4	1.0	...	...	...	0.05	...	0.4	...	...	...	...	...	...	0.2	...	0.5	Remainder					*										
		...	11.0	13.0	0.7	1.0	2.0	0.5	0.9	0.4	1.0	...	...	...	0.05	...	0.4	...	...	...	...	...	...	0.2	...	0.5	Remainder							*								
SG11A	A51S	...	0.60	1.2	1.0	...	0.35	...	0.20	0.45	0.80	0.15	0.35	...	...	...	0.25	...	...	...	...	...	...	0.15	0.05	0.15	Remainder															*
SG70A	356	...	6.5	7.5	0.6	...	0.2	...	0.3	0.2	0.4	...	...	...	...	...	0.3	...	...	...	...	...	...	0.2	0.05	0.15	Remainder		*			*										
		...	6.5	7.5	0.5	...	0.2	...	0.3	0.2	0.4	...	...	...	...	...	0.3	...	...	...	...	...	...	0.2	0.05	0.15	Remainder							*								
(SG2)[6]	A360	...	9.0	10.0	1.3	...	0.6	...	0.3	0.4	0.6	...	...	...	0.5	...	0.5	0.1	...	...	...	...	...	...	...	0.2	Remainder				*											
(SG3)[6]	360	...	9.0	10.0	2.0	...	0.6	...	0.3	0.4	0.6	...	...	...	0.5	...	0.5	0.1	...	...	...	...	...	...	...	0.2	Remainder				*											
SG100A	360	...	9.0	10.0	0.8	...	0.6	...	0.3	0.4	0.6	...	...	...	0.5	...	0.5	0.1	...	...	...	...	...	...	...	0.2	Remainder							*								
SG121A	32S	...	11.5	13.5	1.0	0.50	1.3	...	...	0.80	1.3	...	0.10	0.50	1.3	...	0.25	...	...	...	...	...	...	0.05	0.05	0.15	Remainder															*
SN122A	A132	...	11.0	13.0	1.3	0.5	1.5	...	0.1	0.7	1.3	...	...	2.0	3.0	...	0.1	...	...	...	...	...	...	0.2	0.05	...	Remainder					*										
		...	11.0	13.0	1.0	0.5	1.5	...	0.1	0.9	1.3	...	...	2.0	3.0	...	0.1	...	...	...	...	...	...	0.2	0.05	...	Remainder							*								
ZC60A	C612	...	...	0.3	1.4	0.35	0.65	...	0.05	0.25	0.45	...	...	...	...	6.0	7.0	...	...	...	...	...	...	0.2	0.05	0.15	Remainder					*										
		...	...	0.3	1.3	0.35	0.65	...	0.05	0.25	0.45	...	...	...	...	6.0	7.0	...	...	...	...	...	...	0.2	0.05	0.15	Remainder							*								
ZC81A	Tenzaloy	...	...	0.3	1.0	0.4	1.0	...	0.6	0.2	0.5	...	0.3	...	0.1	7.0	8.0	...	...	...	...	...	...	0.2	0.1	0.2	Remainder		*													
ZC81B	Tenzaloy	...	...	0.3	1.3	0.4	1.0	...	0.6	0.2	0.5	...	0.3	...	0.1	7.0	8.0	...	...	...	...	...	...	0.2	0.1	0.2	Remainder					*										
ZC81A-B	Tenzaloy	...	...	0.25	0.9	0.4	1.0	...	0.6	0.2	0.5	...	0.3	...	0.1	7.0	8.0	...	...	...	...	...	...	0.2	0.05	0.2	Remainder							*								
ZG32A	Ternalloy 5	...	...	0.2	0.8	...	0.2	0.4	0.6	1.4	1.8	0.2	0.4	...	...	2.7	3.3	...	...	...	...	...	...	0.2	0.05	...	Remainder		*													
		...	...	0.2	0.8	...	0.2	0.4	0.6	1.4	1.8	0.2	0.4	...	...	2.7	3.3	...	...	...	...	...	...	0.2	0.05	...	Remainder					*										
		...	...	0.2	0.6	...	0.2	0.4	0.6	1.4	1.8	0.2	0.4	...	...	2.7	3.3	...	...	...	...	...	...	0.2	0.05	...	Remainder							*								

Continued

arbitrarily assigned in alphabetical order to differentiate alloys which otherwise result in identical designations. The full name of the base metal precedes the designation, but it is omitted for brevity when the base metal being referred to is obvious. The letters used to represent alloying elements are shown in Table I.

When a range is specified for the alloying element, the rounded off mean is used in the designation. If only a minimum percentage is specified for the alloying element, the rounded off minimum percentage is used in the designation. When an alloying element is specified as the remainder, the percentage used in the designation is found by computing the possible range in accordance with the percentages specified for the other elements and rounding off the mean of the range. Elements specified as the remainder are ignored in the designation when only a minimum percentage is specified for the base metal.

Designations for unalloyed light metals consist of the specified minimum purity, all digits retained but dropping the decimal point. The digits are followed by a letter arbitrarily assigned in alphabetical order to differentiate metals of the same purity having different impurity requirements. The full name of the base metal precedes the designation, but it is omittd for brevity when the base metal being referred to is obvious.

Five Compositions Covered

ASTM specification B37-49, "Aluminum for Use in Iron and Steel Manufacture," covers five compositions of unalloyed aluminum varying in purity from 85.0 per cent minimum aluminum to 98.0 per cent minimum aluminum. In conformance with the codification system, they are designated 850A, 900A, 920A, 950A and 980A aluminum. The numbers in each designation indicate the specified minimum aluminum content with the decimal point dropped. The letter A in each designation serves to differentiate the metal from any other which might have the same minimum aluminum content but different impurity limits.

ASTM Specification B90-49T, "Magnesium-Base Alloy Sheet," covers two alloys, one of which is designated as magnesium alloy AZ31A. This alloy's composition limits are given in Table II. The designation AZ31A indicates that the alloy contains aluminum (code letter A) and zinc (code letter Z) as the two alloying elements specified in the greatest amount. Their specified percentages are rounded off to whole numbers, three and one respectively. The final letter A serves to differentiate this alloy from any other AZ31 alloy, such as magnesium alloy AZ31B in ASTM Specifications B91-49T, B107-

TABLE IV

Magnesium and Magnesium-base Alloys

Alloy Designations		Chemical Composition Limits—Pct														ASTM Specs.[1]								
		Aluminum		Manganese	Zinc		Silicon	Copper	Tin		Nickel	Iron	Calcium	Total Others	Magnesium									
ASTM	Commercial	Min	Max	Min	Min	Max	Max	Max	Min	Max	Max	Max	Max	Max	Min	B80	B90	B91	B92	B93	B94	B107	B199	B217
9980A		...	...	...	...	...	...	0.02	...	...	0.001	...	...	0.20[2]	99.80	...	...	...	★	...	...	...	...	...
AM60A	Dowmetal A	7.8	9.2	0.15	...	0.3	0.3	0.10	...	...	0.01	...	...	0.3	Remainder	★	...	...	...	...	...	...	...	...
		8.0	9.0	0.18	...	0.20	0.2	0.08	...	...	0.01	...	...	0.3	Remainder	...	...	...	...	★	...	...	...	...
AM100A	Mazlo AM240, Dowmetal G	9.3	10.7	0.10	...	0.3	0.3	0.10	...	...	0.01	...	...	0.3	Remainder	★	...	...	...	...	...	...	★	...
		9.4	10.6	0.13	...	...	0.2	0.08	...	...	0.01	...	...	0.3	Remainder	...	...	...	...	★	...	...	...	...
(AS100)[3] AM100B		9.4	10.6	0.13	...	...	1.0	0.08	...	...	0.01	...	...	0.3	Remainder	...	...	...	...	★	...	...	...	...
		9.0	11.0	0.10	...	0.3	1.0	0.05	...	...	0.03	...	...	0.3	Remainder	...	...	...	...	...	★	...	...	...
AZ31A	Mazlo AM-C52S, Dowmetal FS-1	2.5	3.5	0.20	0.6	1.4	0.3	0.05	...	...	0.005	0.005	0.3	0.3	Remainder	...	★	...	...	...	...	...	...	...
AZ31B	Mazlo AM-C52S, Dowmetal FS-1	2.5	3.5	0.20	0.6	1.4	0.3	0.05	...	...	0.005	0.005	...	0.3	Remainder	...	...	★	...	...	★	...	★	★
AZ61A	Mazlo AM-C57S, Dowmetal J-1	5.8	7.2	0.15	0.4	1.5	0.3	0.05	...	...	0.005	0.005	...	0.3	Remainder	...	...	★	...	...	★	...	★	★
AZ63A	Mazlo AM265, Dowmetal H	5.3	6.7	0.15	2.5	3.5	0.3	0.25	...	...	0.01	...	...	0.3	Remainder	★	...	...	...	...	...	...	...	...
		5.5	6.5	0.18	2.7	3.3	0.2	0.20	...	...	0.01	...	...	0.3	Remainder	...	...	...	...	★	...	...	...	...
AZ80A	Mazlo AM-C58S, Dowmetal O-1	7.8	9.2	0.12	0.2	0.8	0.3	0.05	...	...	0.005	0.005	...	0.3	Remainder	...	...	★	...	...	★	...	★	★
AZ91A	Mazlo AM263, Dowmetal R	8.5	9.5	0.15	0.5	0.9	0.2	0.08	...	...	0.01	...	...	0.3	Remainder	...	...	...	...	★	...	...	...	...
		8.3	9.7	0.13	0.4	1.0	0.5	0.10	...	...	0.03	...	...	0.3	Remainder	...	...	...	...	...	★	...	...	...
AZ91B	Dowmetal RC	8.5	9.5	0.15	0.5	0.9	0.2	0.25	...	...	0.01	...	...	0.3	Remainder	...	...	...	...	★	...	...	...	...
		8.3	9.7	0.13	0.4	1.0	0.5	0.3	...	...	0.03	...	...	0.3	Remainder	...	...	...	...	...	★	...	...	...
AZ91C[4]	Dowmetal R	8.3	9.7	0.13	0.4	1.0	0.3	0.10	...	...	0.01	...	...	0.3	Remainder	★	...	...	...	...	...	...	...	...
		8.5	9.5	0.15	0.5	0.9	0.2	0.08	...	...	0.01	...	...	0.3	Remainder	...	...	...	...	★	...	...	...	...
AZ92A	Mazlo AM260, Dowmetal C	8.3	9.7	0.10	1.6	2.4	0.3	0.25	...	...	0.01	...	...	0.3	Remainder	★	...	...	...	...	...	...	★	...
		8.5	9.5	0.13	1.7	2.3	0.2	0.20	...	...	0.01	...	...	0.3	Remainder	...	...	...	...	★	...	...	...	...
M1A	Mazlo AM3S, Dowmetal M	...	...	1.20	...	...	0.3	0.05	...	...	0.01	...	0.3	0.3	Remainder	...	★	...	...	...	...	...	★	★
M1B	Mazlo AM403, Dowmetal M	...	...	1.20	...	...	0.3	0.10	...	...	0.01	...	...	0.3	Remainder	★	...	...	...	...	...	...	...	...
		...	...	1.30	...	...	0.1	0.08	...	...	0.01	...	...	0.2	Remainder	...	...	...	...	★	...	...	...	...
TA54A	Mazlo AM65S, Dowmetal D	3.0	4.0	0.20	...	0.3	0.3	0.05	4.0	6.0	0.03	...	...	0.3	Remainder	...	...	★	...	...	...	...	...	...

[1] Specifications for:
B 80-49T. Magnesium-Base Alloy Sand Castings.
B 90-49T. Magnesium-Base Alloy Sheet.
B 91-49T. Magnesium-Base Alloy Forgings.
B 92-45. Magnesium Ingot and Stick for Remelting.
B 93-49T. Magnesium-Base Alloys in Ingot Form for Sand Castings, Die Castings, and Permanent Mold Castings.
B94-49T. Magnesium-Base Alloy Die Castings.
B107-49T. Magnesium-Base Alloy Bars, Rods, and Shapes.
B199-49T. Magnesium-Base Alloy Permanent Mold Castings.
B217-49T. Magnesium-Base Alloy Extruded Round Tubes.

[2] Total of aluminum, copper, iron, manganese, nickel, and silicon.

[3] The designation in parentheses, which does not conform to the designation system for light metals and alloys, is used in B93 and B94 to designate this alloy in the form of ingot and die castings.

[4] In ingot form for sand castings this alloy is designated as AZ91A in B93.

49T and B217-49T. This alloy differs from AZ31A in that it does not have a specified limit for calcium.

Table III covers aluminum and aluminum-base alloys, their ASTM and common commercial designations, ASTM chemical composition limits, and the ASTM specifications in which they appear. Table IV gives the same information for magnesium and magnesium-base alloys.

A new system for designating tempers was adopted[8] by the aluminum industry in 1948. It is also being used in the magnesium industry. Recent issues of many specifications designate tempers according to this system. The ASTM uses it in their specifications for aluminum and aluminum-base alloys. It will be used in their specifications for magnesium and magnesium-base alloys when they are next revised. It is also planned to combine the codification system for light metals and alloys with the temper designation system for issuance by the ASTM as "Recommended Practices for Codification of Light Metals and Alloys, Cast and Wrought."

References

[1] *Proceedings, ASTM, Vol. 42, 1942, p. 219.*

[2] *Proceedings, ASTM, Vol. 45, 1945, p. 139.*

[3] *Proceedings, ASTM, Vol. 44, 1944, p. 266.*

[4] *Proceedings, ASTM, Vol. 46, 1946, p. 259.*

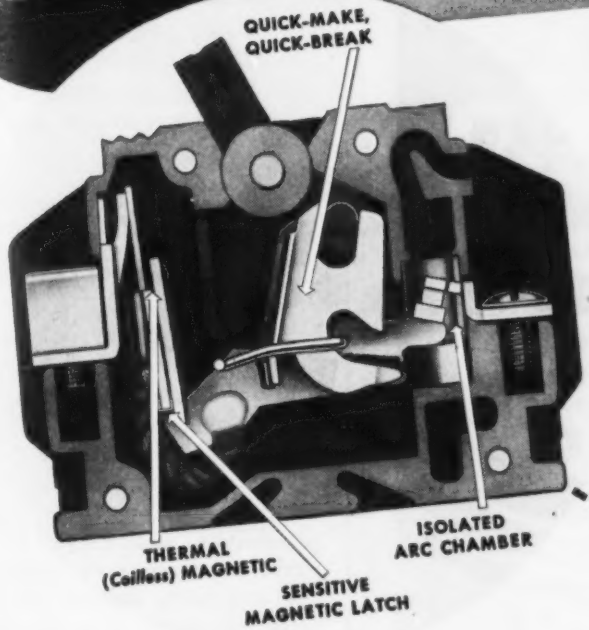
[5] *R. B. Smith, "ASTM Code Systems for Aluminum Alloys and Magnesium Alloys," ASTM Bulletin, March 1948, p. 50.*

[6] *John C. Kiszka, "What's In An Alloy?" ASTM Bulletin, March 1948, p. 51.*

[7] *"Tentative Recommended Practices for Designating Significant Places in Specified Limiting Values," 1949 Book of ASTM Standards, Part 2, p. 1051.*

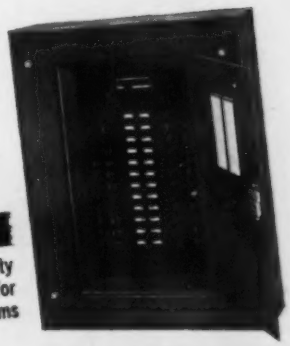
[8] *R. B. Smith, "New Temper Designations for Aluminum Alloys," THE IRON AGE, June 24, 1948, p. 72.*

NEW TYPE QB CIRCUIT BREAKER for NQB Lighting Panelboards

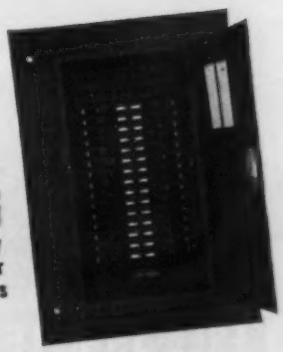


Completes the Line

TYPE NMO
MO Plug-In Standard Duty breakers for AC systems



TYPE NQB
QB heavy duty breakers for AC systems



TYPE NAB
ML heavy duty breakers for AC-DC systems

a **NEW QB circuit breaker** for NQB panelboards features an isolated arc chamber lined with arc resisting material which eliminates need for metal plates or other interrupting means. Operating mechanism is quick-make, quick-break. Stainless steel latch, independent of trip element, assures superior vibration characteristics. Thermal-(*Coilless*) Magnetic trip element is typical of other lighting panelboard types in Square D's broad line.

All Have 2-WAY PROTECTION

THERMAL element is a bi-metal providing positive and timed response to heating effects of both load current and surrounding atmosphere. The life of wire insulation is prolonged by limiting total temperature to a safe value.

MAGNETIC element responds instantaneously to the higher values of current characteristic of dangerous overloads and "shorts." Damage is minimized.

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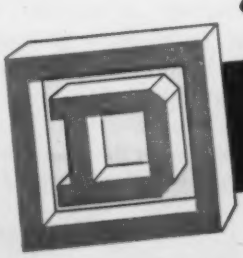

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publications

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booklet. Including photographs and details of 22 separate safety items, the booklet is concerned with problems of air and surface contamination involving radioactive or toxic contaminants. Described in the booklet are respiratory protective equipment, air sampling equipment, ventilation accessories, protective clothing, materials for contamination control, automatic artificial respiration instruments and oxygen therapy equipment. *Mine Safety Appliances Co.*

For free copy insert No. 9 on postcard, p. 35.

"Walkie" Battery Data

Nine new specification sheets covering "walkie" type batteries detail the battery to be used with a given make of truck. Each data sheet recommends battery types for light, normal, and heavy duty. A specification table on each sheet designates battery type, capacity, dimensions, and weight for each manufacturer's truck models. Layouts and tables indicate the type of terminals, plugs, or receptacles supplied to fit specific models. These specifications permit materials handling supervisors, battery room foremen, or purchasing agents quickly and easily to select the right battery for each truck and for the job it must do. *Gould-National Batteries, Inc.*

For free copy insert No. 10 on postcard, p. 35.

New Water Solvent

Immunol, the new 3-purpose solvent for use in metalworking plants, is described in a 12-p. booklet showing how to save money by eliminating additional cleaning operations. The solvent's chief use and purpose, as shown in the booklet, is to immunize any water against rust; this includes water in which soluble oils are used. Increased wetting-out properties of any solution are claimed and the solvent acts as a powerful detergent. Method of application for cleaning metals is given. *Haas Miller Corp.*

For free copy insert No. 11 on postcard, p. 35.

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production ideas

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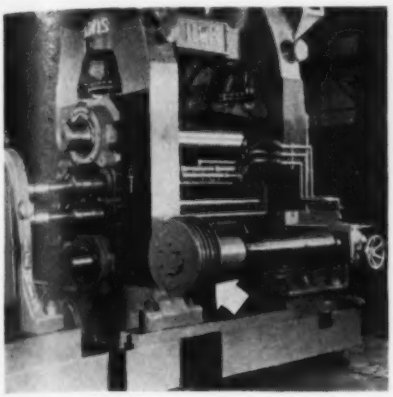
brated against air pressure and controlled by an air valve. Ordinary factory line compressed air is adequate. Changing tension requirements as the coil is dereeled



are made by adjusting the air pressure to the brake according to a calibration chart. *Linderman Devices.*

For more data insert No. 30 on postcard, p. 35.

Pillow Blocks

Self-aligning, precision ball bearing; shaft diam, ½ to 1¼ in.

A new line of pillow blocks and flanged cartridges feature a specially designed labyrinth seal, known as the Safety-Vent-Seal, that automatically provides the

correct amount of lubricant, excess grease being permitted to escape under pressure. The chrome alloy ball bearing used in these supports has a spherically ground OD to permit the bearing to align itself in the rigid, one-piece housing that is

production ideas

Continued

cast of Boston gear iron. This makes for accurate shaft alignment and quick mounting. *Boston Gear Works.*

For more data insert No. 31 on postcard, p. 35.

Strain Recorder

High-speed inkless, for static and dynamic load measurements.

A new recording SR-4 strain amplifier reproduces both static and rapidly changing SR-4 strain gage measurements of strains, forces, fluid pressures, displacements, vibrations, and acceleration, on a strip chart with rectangular coordinates. The instrument is a

direct-reading inkless, vacuum-tube voltmeter consisting of an ac powered strain gage amplifier of modulated carrier type in which the bridge is excited at 2500 cycles per sec by a built-in oscillator, a D'Arsonval moving coil recording galvanometer in which a current of 1-milliamp produces a writing arm torque of 200,000 dyne cms, and 1 cm deflection, and a paper drive mechanism. *Baldwin Locomotive Works.*

For more data insert No. 32 on postcard, p. 35.

Hand Serrating Tool

For use with Karbate graphite pipe.

The tool is simple, rugged, and easy to use, assuring a tight, workmanlike joint in minimum time. It facilitates quick assembly of Karbate impervious graphite pipe on the job site. Pipe sizes from 1 to 6 in. may be serrated. *National Carbon Div., Union Carbide & Carbon Corp.*

For more data insert No. 33 on postcard, p. 35.

Resume Your Reading on Page 39

news of industry

Price Freeze and CMP are Readied for Action

Prices expected to ice-up about Feb. 15 . . . Eric Johnston in, Valentine out as Wilson makes up mind . . . ESA battles over date to set prices . . . Controlled economy coming.

Washington—Two basic government anti-inflation weapons—price controls and a controlled-materials plan—are being readied for active service this week.

While no decision has been reached as to the effective date of each of these controlled-economy devices, top Administration advisors indicate a general price-freeze will be ordered by mid-February and a CMP by early June.

President Truman's decision to control prices via the general-freeze approach, rather than on a commodity-by-commodity basis (the "selective" approach) was revealed over the week-end in his appointment of Eric Johnston as Economic Stabilizer. Mr. Johnston's predecessor, Alan Valentine, had opposed the quick "freeze" approach to price stabilization.

Economic Stabilization Agency officials indicate they expect a price-freeze order to become effective about Feb. 15.

The level at which prices will be frozen is bitterly disputed within the agency, however, with some economists favoring a roll-back to Dec. 1 levels and others seeking to peg prices at Jan. 1 or Jan. 15 levels.

Decides Definitely on CMP

Charles E. Wilson, the government's top mobilization planner, disclosed his definite decision to adopt a Controlled Materials Plan at a Congressional hearing.

"We will ultimately come to it," he declared, indicating details of the plan were being worked out by William H. Harrison, head of the National Production Authority.

Equitable Distribution Sought

Mr. Harrison takes the view that a CMP is the only known method of bringing about "reasonably equitable and efficient distribution of scarce materials for civilian consumption."

But he also recognizes the administrative pitfalls inherent in any such system. Among these, he feels, are such drawbacks as the huge administrative staff required, the fact that such a plan must apply to every consumer without exception, and—most important—the military's current inability to make up its mind as to the extent of its materials needs.

NPA to Aid Farm Machine Makers

Washington—The National Production Authority is planning to work with industry and the Agriculture Dept. to keep steel and other materials flowing to agricultural equipment manufacturers. A special section will aid companies on an individual basis.

This decision was made after Farm Equipment Advisory committeemen reported farm machinery output might drop 25 pct under last year's rate by June.

Steel for Defense

Washington — From 12 to 14 pct of current steel production is channeled directly into defense production and large additional amounts go to supporting purposes, such as the freight car program, NPA's David B. Carson, of the Iron and Steel Div., told the Senate Small Business Committee last week.

He said present steel capacity of 104 million tons should be increased by over 10 million tons in 2 years but that problems of raw materials, transportation, ore boats, etc., would have to be overcome. NPA will continue a policy of seeing that military or defense orders get right of way at mills, Mr. Carson stated.

Bendix Buys Ford Plant

Detroit—Bendix Aviation Corp. has purchased the Hamilton, Ohio, plant of Ford Motor Co. for the production of aircraft parts and accessories. Ford used the Hamilton facilities until a few months ago for stamping operations. The new plant at Hamilton will be operated as a division of Bendix, according to Malcolm P. Ferguson, president of the company.

Ferguson Gets Arsenal Contract

New York—Contract for installation of process equipment at Picatinny Arsenal, Dover, N. J., has been awarded H. K. Ferguson Co. The $650,000 project will be completed within 6 months.

INDUSTRIAL SHORTS

EXPANSION PROGRAM — A $2.5 million expansion program is under way at the CLEVELAND PNEUMATIC TOOL CO., Cleveland. One million is being privately financed and covers plant expansion, re-arrangement and machine tools. The balance covers machine tools being acquired under a government facilities contract.

BRANCH PLANT — Approximately 180 acres at Hampstead, Md., have been purchased by BLACK & DECKER MFG. CO. for the erection of a branch plant to manufacture portable electric tools. Building is expected to start around April or May and about 300 to 400 people will be employed at the plant in a year's time.

CONSOLIDATION — Wood Works, the stainless steel processing plant of U. S. STEEL CO., is now the Wood Works plant of the company's Irvin Works, McKeesport, Pa. No changes are contemplated in the management personnel of Wood Works.

BUILDING NEW HOME — A new plant is being built in Englewood, a suburb of Denver, by C. A. NORGREN CO., manufacturers of pneumatic equipment. The company is also observing its 25th anniversary this year.

CHANGES NAME — Gordon & Kinney, Inc., Detroit, has adopted the new name of J. ALEX GORDON & CO. The company is sales representative for the Automatic Transportation Co., Chicago, covering the Detroit industrial area.

MORE SPACE — LATROBE ELECTRIC STEEL CO. has moved its Los Angeles office to larger quarters at 3537 E. Olympic Blvd. New location includes a 3500 sq ft warehouse for high speed tool and die steels, tool bits and drill rod.

WEST COAST AGENT—Eriez Mfg. Co. Erie, Pa., has appointed C. D. SUTTON, INC., as their representative in the Los Angeles area. Sutton will handle the complete Eriez line, which includes all permanent magnetic separation equipment of its own manufacture, Memco electromagnetic separation equipment and RCA electronic metal detectors.

BROADENS ACTIVITIES — West Coast regional headquarters have been established in Los Angeles by the BELLOWS CO., Akron, Ohio, manufacturers of Bellows "controlled-air-power" devices for industrial use. The company will also take over all distribution sales activities for Smith-Johnson Corp., Los Angeles, manufacturers of Senacon pneumatic equipment, formerly handled by Conapco, Inc.

WESTERN OUTLET — The WHITNEY CHAIN CO. of Hartford has established a new office and warehousce building in Los Angeles with A. J. Swisler as district manager. This branch will function as the engineering sales and service outlet for Whitney's complete line throughout southern California and Arizona.

NEW QUARTERS—The Baroid Sales Div. of the NATIONAL LEAD CO. has awarded a contract to the H. K. Ferguson Co. for construction of a new office building and research center in Houston.

GROUP OFFICIALS—Otto H. Fischer, president of Union Diesel Engine Co., Oakland, Calif., has been elected president of the DIESEL ENGINE MANUFACTURERS ASSN. William E. Butts, president of General Metals Corp., San Francisco, was elected to the board of directors.

Copper, Brass Price-Freeze Studied by Government, Industry

Bring OPA price lists up to date; . . . Some ingot cuts promised ESA

Washington — The government is studying price-freeze recommendations submitted by the copper and brass industries.

Industry representatives, including scrap dealers, refiners, and ingot makers have been bringing former OPA price lists up to date.

The Economic Stabilization Agency is studying the recommendations, but has not indicated when or how price ceilings will be imposed on the copper and brass industries.

Brass mill industry spokesmen told ESA they would agree to price stabilization if assured prices of raw materials, including scrap, were also stabilized.

Ingot makers indicated willingness to subscribe to a voluntary price stabilization agreement, ESA said. Under this proposal, companies would give ESA advance notice of any proposed price increase, provided there would be no increase in the primary metal market.

ESA said it had been assured by some ingot producers they were reducing their selling prices on certain grades of ingot, effective immediately, and accordingly will reduce their buying prices for the scrap they use.

NPA Amends Steel Order M-1

Washington—Certification that materials purchased for the freight car program will be used for no other purpose must be obtained under amendment to NPA M-1. Exact amounts of materials and required delivery dates must also be given.

Industrial alcohol, chlorine, natural and synthetic rubbers and other non-metallic materials have been added to the list of materials on NPA Notice 1 which may not be stocked in excess of reasonable needs or resold at higher than market prices.

MORE SCRAP FOR WAR: Scene is the exhibit room of the Institute of Scrap Iron and Steel Convention in New York's Commodore Hotel last week. The sign points out the importance of scrap in steelmaking and defense while men of the trade discuss expanded war volume that is needed and the coming clampdown of controls.

Steel Co. of Canada Plans 50 Pct Plant Capacity Expansion

Will boost potential to 1.9 million tons at cost of $40 million.

Toronto—The Steel Co. of Canada, Ltd., plans plant expansion to boost capacity by 50 pct at a cost of $40,000,000, H. G. Hilton, president, announced.

It will take about 18 months to complete the program. Principal features of the new undertaking are enlarged dock and storage facilities, additional coke ovens, a new blast furnace and a new open-hearth furnace shop in which will be installed four furnaces of 250 tons capacity each. On the completion of the new project the company will have four blast furnaces and capacity will be boosted 450,000 tons to 1,207,000 tons annually. Steel ingot capacity will be increased by 650,000 tons to 1,900,000 tons, enabling the company to produce over four times its average annual ingot rate during the years 1935 to 1939.

Increase in Flat-Rolled

While the additional steel will be rolled into the various products now being produced by the company, the major increase will be in hot and cold-rolled sheets, which have been scarce, the president stated. He emphasized that the expansion was a normally planned one and not caused by war conditions. Engineering work is well advanced and initial contracts have been placed.

Although the expansion program is the largest ever planned by the Hamilton industry in such a short time, the Steel Company has spent $65,000,000 on expansions to its Hamilton plant in the last 10 years.

Algoma Steel Corp., Ltd., is embarking upon a plant expansion program to cost about $10,000,000 which will involve installation of a strip and skelp mill. Morgan Construction Co., of Worcester, Mass., is reported to have the construction contract and Canadian General Electric Co., Ltd., a $1,600,000 contract to supply the main electrical drive. The new additions are expected to be in production in 1952.

Jones & Laughlin Splits Stock

Pittsburgh — Stockholders of Jones & Laughlin Steel Corp. have approved a proposal that common stock be split two-for-one, and have authorized an increase in indebtedness from $150 million to $180 million. They also approved a change from no par to $10 par.

NPA M-30 Limits Tungsten Use

Washington—The National Production Authority order M-30 sets up a tungsten allocation system and limits use of the metal for abrasives, high-speed steels, and pigments.

Effective Mar. 1, NPA authorizations based on end use must be obtained for tungsten for making high-speed steel. Effective at once, orders for class B high-speed steel must not exceed 20 pct of total monthly requirements.

Small users of 500 lb of high-speed steels per quarter are exempt. Inventories of 50 lb or more must report them and inventories are limited to a 60-day supply or working level, whichever is less.

Seeks Ways to Raise Benzene Production by 103 Million Gals

See 15 million gals extra from coke, 88 million gals from oil

Washington—A survey is being made by the Defense Solid Fuels Administration for the purpose of finding ways to increase benzene production from coke ovens. Output from this source is expected to be increased by 15 million gals over the next 2 years.

This announcement was made simultaneously with a meeting of benzene producers and users with National Production Authority officials, at which time a resolution was adopted asking the government to authorize construction of facilities to produce 88 million additional gals from petroleum.

Current needs are estimated at 252 million gals. Some 12 million gals are currently being produced from petroleum and 165 million gals are being recovered from coke ovens.

Petroleum Administration for Defense says enough applications for certificates of necessity have been received to result in production of more than the volume needed. Several have been granted and others are being studied.

TVA to Get 3 New Generators

Pittsburgh—Westinghouse Electric Corp. will build three vertical water-wheel generators of 31,250 kva capacity for the new Boone Dam of the Tennessee Valley Authority. The generators will cost approximately $2 million. All units are scheduled to operate by '53.

GSA Reopens Velasco, Tex., Manteca, Calif., Magnesium Plants

Washington—Arrangements for reopening two more reserve magnesium plants have been completed by the General Services Administration. Their total production over the next 2 years is estimated at about 200,000,000 lb.

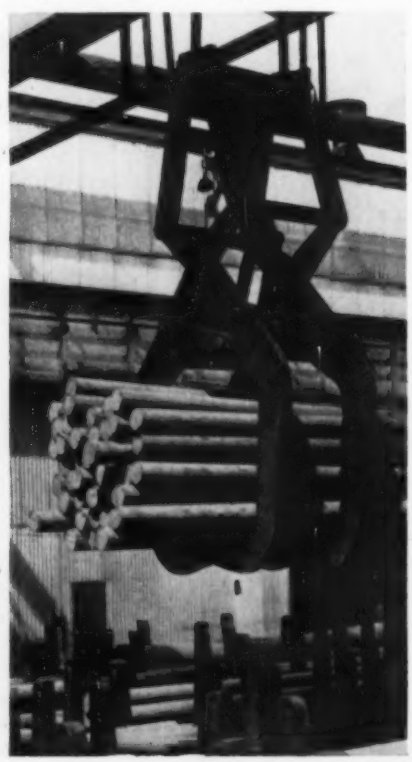
Dow Chemical Co. has leased the plant it operated during the war at Velasco, Tex., for a 2-year period and will sell the entire output, estimated at 160,000,000 lb, to the government. Operations are scheduled to begin in May after $3 million worth of renovating and modernizing work.

Through another agreement, the Kaiser Magnesium Co. will operate the government plant at Manteca, Calif., which was operated by Permanente during the war. Some $700,000 will be spent in getting the plant ready for operation by July. Output for the 2-year period is set at 40,000,000 lb.

The GSA has also contracted with Kaiser Aluminum & Chemical Corp. to supply Manteca with ferrosilicon and calcined dolomite. These magnesium components will come from a plant at Permanente, Calif., and another at Natividad, Calif., both to be reactivated by Kaiser.

Dow is also completing installations at Madison, Ill., where the first continuous rolling mill for magnesium will produce for defense. The plant also will have extrusion equipment.

A STEELY GRIP: Automatic tongs and an automatic locking device enables a craneman to singlehandedly load rolled steel rounds weighing up to 30,000 lb. Assisting in development of the tongs were mill designers, engineers, and operators at the Lorain, Ohio, plant of National Tube Co. Heppenstall Co., Pittsburgh, designed a unique automatic locking device.



Confidence in Moses Pays Dividends in Peace

Coal grants voluntary wage hike, beating gun on wage-price controls . . . Lewis fire, brimstone tactics replaced by discreetness . . . Industry had built stocks,—*By John Delaney.*

Pittsburgh—The soft coal industry's confidence in Harry M. Moses is paying off.

For the first time, the industry has granted a wage increase to John L. Lewis and his United Mine Workers without a strike and without the customary name-calling.

The increase was granted voluntarily by the operators. Under their contract they didn't have to think about wages until next month. However, the imminence of price-wage controls was a factor in the early settlement.

Reduce February Stocks

Harry Moses and John Lewis did the job—so quietly and efficiently—that it left the industry and the rest of the country gasping. The negotiations included the usual give and take. But these two old friends, conscious of their responsibilities in the national emergency, came up with a nice, business-like settlement that nobody could get mad about. Both sides won concessions.

To say that a lot of people were surprised is an understatement. In anticipation of the usual crisis and possible strike, everybody was stocking up on coal. So much so that February probably will be one of the industry's poorest months as consumers reduce heavy inventories. Business will improve, though, as the defense program builds up steam and with shipments of 5 million tons or more to Great Britain between now and June.

The Moses-Lewis meetings began last Dec. 27—less than 3 months after Moses resigned as president of H. C. Frick Coke Co., a U. S. Steel subsidiary, to represent the Northern Coal Operators and 200 million tons of capacity, little more than a third of which is so-called captive tonnage of steel producers. Moses is president of the Bituminous Coal Operators Assn.

The meetings continued, except for holiday recesses, until a tentative agreement was reached. The agreement called for a wage increase of $1.60 per day—20¢ an hour, increasing the basic daily pay of 370,000 coal miners to $16.35, effective Feb. 1. This represented, roughly, an average between what Moses offered and what Lewis demanded. Dismissed early was any consideration of a reduction in the work-day or an increase in the miners 30¢ per ton welfare fund royalty.

Join the Bandwagon

Moses took this agreement to the people he represented and asked their approval. He got it—unanimously.

The rest of the industry— Joseph E. Moody's Southern Coal Producers Assn., Harry Treadwell's Illinois group, and the western operators—almost tram-

pled one another in their haste to say, "Me, too." Anthracite operators came along later.

The agreement assures peace in this vital industry until at least Mar. 31, 1952. It does not expire automatically, but only if notice of intent to cancel is given 60 days in advance. If such notice is not given, the contract continues in effect for 60 days after notice actually is served. This clause automatically eliminates danger of a no-contract, no-work strike without a full 60 days to reach settlement.

The Mar. 31 expiration date also is a concession to the operators. This gives them at least a full year before they start thinking about the possibility of new contract demands.

Coal operators will ask for a 5 or 6 pct price increase to cover cost of the pay hike.

Moses, Lewis Write the Peace

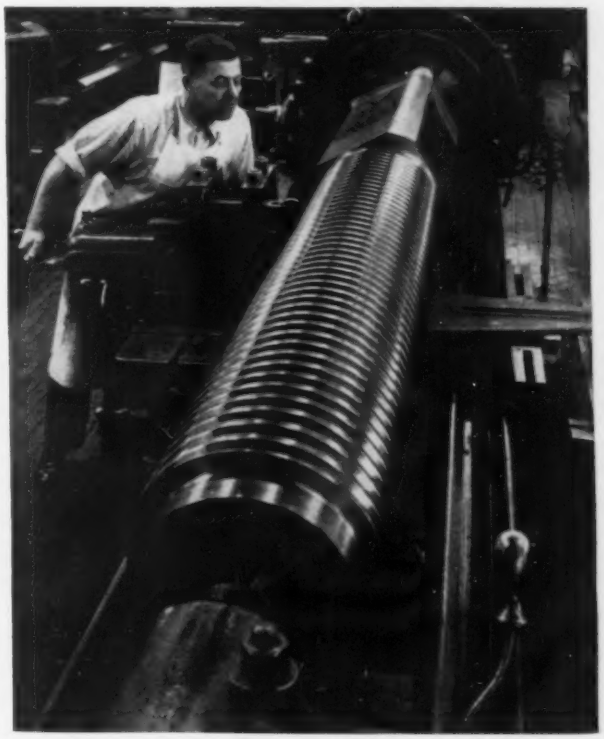
Reports of behind-the-scenes dictation by Benjamin F. Fairless, president of U. S. Steel Corp., or George Love, president of Consolidation Coal Co., are ridiculous. Moses saw neither of these men prior to the tentative agreement with Lewis.

An incident that occurred at the contract signing pointed up the harmony that now exists between Lewis and the industry in contrast to the bitterness of previous years. When someone handed Lewis a note advising that 11 miners had been killed in a West Virginia explosion, he didn't take it as a cue to tee off on the safety shortcomings of the industry. Instead, he looked up and said quietly:

"That, gentlemen, is what our men contribute to the country."

Two Furnaces Out of Blast

Pittsburgh—U. S. Steel Co. has blown out two blast furnaces this month. Its No. 5 furnace at the Ohio works was blown out Jan. 18 for relining and enlarging and its No. 2 furnace at Clairton went out on Jan. 7 for repairs.



AN INDUSTRIAL BEAUTY: In Ford's Dearborn, Mich., Rouge plant, toolmaker Paul F. Miller works on the surface of giant screw undergoing a thread-rolling operation that closes pores and gives the thread a high surface finish to cut frictional wear. He is taking more pains than a diamond cutter. The screw will control adjustments of rolls in Ford's steel rolling mill. Threads are 15 in. in diam and the screw is 13 ft long.

Steel Firms Negotiate For Steep Rock Iron Ore Land Rights

Cleveland—Pickands, Mather & Co., acting for a group of steel and iron ore producers, is negotiating with Steep Rock Iron Mines, Ltd., for an agreement to explore and an option to lease certain iron ore property in the Steep Rock Lake area in Western Ontario, said Elton Hoyt, 2nd, senior partner of Pickands, Mather & Co.

Others of the group are Bethlehem Steel Co., Youngstown Sheet & Tube Co., The Steel Co. of Canada, Ltd., and Interlake Iron Corp.

Mr. Hoyt said that, while details of the agreement are still to be worked out, exploratory work in the near future is planned. If sufficient ore should be proved, the company taking the lease will be managed by Pickands, Mather & Co., he said.

He declined to discuss tonnages but said it is hoped that the project will disclose deposits of some magnitude.

The property covers more than 1000 acres and is in the general vicinity of Inland Steel Co. land optioned from Steep Rock Iron Mines a year ago.

The area controlled by Steep Rock lies about 140 miles west of Port Arthur and Lake Superior, and is connected with Port Arthur by rail.

Carboloy Makes Heavier Metal

Detroit—Manufacture of a non-cutting metal heavier than cemented carbide and of 50 pct greater density than lead has been announced by Carboloy Co., Inc.

The new material, trade name Hevimet, will be widely used for static and dynamic balancing, since it provides maximum weight with minimum size. It will also serve as a screen for gamma rays in radiotherapy and other applications.

Alabama Plant to Make Munitions

Huntsville, Ala.—The former Dallas Mfg. Co. textile mill, sold and dismantled in 1949 and turned into a warehouse, will be converted into a munitions plant, according to Richard W. Wirt, Southern Railway official.

Roads Ask ICC for General 6 Pct Freight Rate Increase

Ask rise in handling charges at lower lake ports, boost for coal.

Washington—The railroads last week asked the Interstate Commerce Commission for authority to put into immediate effect a general 6 pct freight rate increase which they proposed 2 weeks ago. Refunds would be paid or allowed for any increases not finally approved by the ICC.

No increase has been asked for storing iron ore at lower Lake ports, nor in handling charges at upper Lake ports on shipments forwarded from there by water. But handling charges at the lower Lake ports would take the increase.

Coal Boost Sought

Instead of the general increase, a specific boost of 18¢ per net ton or 20¢ per gross ton is sought for coal. In the case of the Nickel Plate (New York, Chicago & St. Louis R.R.), the road would not increase bituminous rates for shipments picked up and delivered within the state of Ohio. This is to offset trucking competition.

Demurrage charges would not be increased, nor would allowances paid by the roads for drayage and similar services performed for the roads by shippers or receivers. But the proposed increase would apply to numerous other services, including protective service, switching, diversion, etc.

Also taking the general increase would be line haul rates on truck bodies, trailers or semi-trailers, as well as class rates along with joint water rates. Adjustments would be made later to restore normal differentials.

Alcan to Reopen Smelter

Montreal — Aluminum Co. of Canada, Ltd., proposes to reopen its smelter at Beauharnois, Que., next April and has arranged for a power supply of 100,000 hp to operate the plant. With this plant operating the company will add some 32,000 metric tons of primary aluminum ingots a year. The addition of the Beauharnois smelter to those already operating at Shawinigan Falls, Arvida and Isle Maligne, Que., will raise Aluminum Company's ingot capacity to well over 400,000 tons a year.

Steel Firms Give Workers Right Steer to Bond Savings Plan

Drive against inflation . . . Bulk of personnel sign up for savings.

New York—Broadsides against inflation are skillful appeal-to-reason campaigns through which many steel companies are signing thousands of their employees on the Payroll Savings Plan.

Metalworking plants were quick in the footsteps of National Tube Co., which evolved a successful technique in convincing workers that buying savings bonds on the payroll plan meant serving country and themselves. (THE IRON AGE, Oct. 26, 1950, p. 80.)

Carnegie-Illinois Steel Corp., now part of U. S. Steel Co., had only 18 pct of its staff on the plan before C. F. Hood, Carnegie president, opened a drive that saw 59,000 workers sign their names on the dotted line. The works now has 77 pct participation among 100,000 employees.

". . . But you *can't* quit. You've been in charge of misfiling for years!"

Crucible Starts from Scratch

Allegheny Ludlum's drive achieved 82.2 pct participation among 13,700 employees. Columbia Steel Co. recently completed its campaign, starting with less than 10 pct participation and finishing with 85.2 pct of 7500 workers. This was the record for all West Coast industry.

Incomplete results from Weirton Steel shows that the plant is at 53.6 participation. American Bridge Co. signed up 92.8 pct at its Ambridge plant and is working on other plants now. Starting from scratch and reinstating the plan, Crucible Steel Co. convinced 78 pct of its employees at the Syracuse plant to sign up.

Disregarding high-pressure sales tactics, Gerrard Steel Strapping Co. has 97 pct on the plan. Other firms now in the drive stage include Koppers Co., Inc.; Aluminum Co. of America, American Radiator and Standard Sanitary Corp.

Maintenance Show Speaker Asks Equipment Care for Defense Effort

Four-day show attracts 10,000 as 170 companies man exhibit booths.

Cleveland—Basic necessity for victory, even more than the number of men in the armed forces, is the productive capacity of a nation, Herman W. Steinkraus, president, Bridgeport Brass Co., Bridgeport, Conn., told engineers at the second annual Plant Maintenance Show banquet here.

Care for Defense Role

The former president of the U. S. Chamber of Commerce warned that "we will have to live for a good many years with a major defense program as a part of our annual effort."

This means that our equipment must be so geared that we do not break down under the load. If equipment and facilities are over-

loaded, the destruction is at a much faster rate than if loads are kept within the capacity of that equipment. In a defense program maintenance becomes important.

The banquet was sponsored by the Cleveland section and the management division of the American Society of Mechanical Engineers. Cooperating societies were the Cleveland Engineering Society and the Cleveland section of the Society for the Advancement of Management.

The 4-day Plant Maintenance show, which opened Jan. 15 at Public Auditorium here, attracted more than 10,000 visitors. More than 170 companies exhibited products and services. Theme was more efficient, cheaper plant upkeep.

Conference sessions, sponsored by the American Society of Mechaical Engineers and the Society for the Advancement of Management, featured talks by 44 experts on maintenance operations with emphasis centered on reducing maintenance costs.

At the sectional conference on maintenance in metalworking plants, F. A. French, chief plant engineer, John A. Roebling's Sons Co., Trenton, N. J., outlined a 13-point maintenance organization for larger plants.

No Chrome Stainless Cuts

Pittsburgh—There will be no immediate restrictions on the use of straight chrome grades of stainless steel for civilian purposes.

The government's order limiting civilian applications of stainless, expected shortly, will apply only to the nickel-chrome grades, or 300 series. There is nothing in the works at the present time pertaining to straight chrome types. NPA feels there is no need just now to restrict straight chrome applications for non-defense use.

PA's Pay More in Extras After Steel Rise

They feel cost pressure of higher extra charges on sheet and strip products after December base price rise . . . U. S. Steel Corp. is exception to trend of raising extra charges.

Pittsburgh — After steel base price increases last December, purchasing agents for steel consumers began to feel the cost pressure of higher extra charges on sheet and strip products, advanced by some producers, with the notable exception of U. S. Steel Corp.

Depending on their source of supply, some steel users are paying more in extras on hot and cold-rolled sheets, hot-rolled strip, galvanized sheets, and long ternes.

Increases in Extras

On the sheet and strip products they produce, extras were increased by Great Lakes Steel Corp., Weirton, Republic, Jones & Laughlin, Armco, Bethlehem, Youngstown Sheet & Tube, and others.

Hot-rolled sheet extra increases include: gage and width $2 per ton on all gages 48-in. and narrower, and $1 per ton over 48-in. up to 72-in.; side cutting, all gages and widths, generally up $1 per ton; cut lengths, up from $1 to $3 per ton; closer than standard side cutting, $1 to $2 per ton; restricted tolerances, for not more than 75 pct of standard tolerance, $5 per ton; for not more than 50 pct of standard tolerance, no change to $5 per ton.

Some mills now charge an item quantity extra of $3 to $4 for quantities under 20,000 lb. to 10,000 lb., whereas the former minimum quantity without extra was 10,000 lb. Extra for under 10,000 lb. to 6,000 lb. is up $4; under 6,000 lb. to 4,000 lb., up $6; under 4,000 lb. to 2,000 lb., up $5 to $10; under 2,000 lb., up $10.

Order quantity extra is up $5; item extra for exact quantity up $8; extra for circles up to $2 in some instances; sketches up $3 for regular, $5 for irregular; a new outside inspection extra of $3; resquaring extra up 5 pct; pickling extras up $2; corrugated extra up $3; oiling extra up $3; greased edges up $4; lined up $3; breaker passed or back coiled up $3; some heat treatment extras up $4 to $5; quality extras generally up $2; specific and restricted test requirements generally up $2; packaging extras up $1.50 to $8 per ton on cut lengths; $2.50 to $5 per coil, and 50¢ to $16 per package.

Extra advances on cold-rolled sheets are generally the same as for hot-rolled. Cold-rolled gage and width extras are up $2 for widths of 48-in. and under, and $1 for widths over 48-in. to 72-in. Length extras are up from $1 to $6, although on the popular sizes the range of increase is $1 to $2. Cold-rolled primes only are up $5. Circles are up $2, sketch extras $3; a new inspection extra, $3.

On hot-rolled strip, gage and width extras for all thicknesses are up $1 on 2-in. wide, and $2 for over 2-in. to 12 in. Pickling extras are up $1 to $2; extras for cutting to length up $1 to $3; packaging extras up 50¢ to $3.

Coating Extras Up, Too

Galvanized sheet flattening extras are up $2 for 22 gage and heavier. Resquaring extra, not stretcher leveled, increased from 10 pct to 15 pct; if stretcher leveled, up from 12½ pct to 17½ pct. Packaging, quantity, and processing extras are revised.

All gage and width extras on long ternes are up $2. The length extra for 60-in. to 96-in. is now $4 for all gages instead of the former range of $1 to $4. An extra of $8 now exists for lengths of 96-in. to 144-in., where there was none before. Coating extra for heavier than commercial, up $3.

Bethlehem Unwraps Huge New Expansion Plan

Capacity to be expanded 1.6 million tons by end of next year . . . Expanded 1 million tons last year . . . Total cost is placed at about $300 million—*By Bob Hatschek.*

New York—Bethlehem Steel Co. is continuing the expansion which added 1,000,000 ingot tons of capacity in 1950 with an additional 1,600,000 tons which will bring Bethlehem's total capacity to 17,600,000 tons by the end of 1952. The total 2,600,000 ton program will cost about $300 million. It includes openhearths, blast furnaces, rolling mills, coke ovens, ore facilities, more power, transportation and other facilities.

This is Bethlehem's answer to other steel firms who, in planning to build new mills in the East, are invading Bethlehem's traditional territory. These eastern expansions point to a highly competitive steel market in this area when they are completed. The short-range defense program, however, is of prime importance.

The breakdown of new steel facilities is: Lackawanna, 1,080,000 tons; Sparrows Point, 740,000 tons; Steelton, 352,000 tons; Bethlehem, 188,000 tons; Johnstown, 180,000 tons; and Los Angeles, 60,000 tons.

Add Blast Furnace Capacity

A new blast furnace is to be built at Lackawanna and a sintering plant is going up at Sparrows Point along with other improvements to blast furnace equipment at these and other plants. A 76-oven battery and a 65-oven battery to be built at Lackawanna and Sparrows Point, respectively, will join the two 77-oven coke batteries already authorized last year for Johnstown in supplying blast furnaces with needed coke.

Necessary raw materials are included in the program with the acquisition and development of new ore, coke and limestone sources. Existing coal and limestone facilities have already been improved.

Besides planned improvements on its short line railroads, Bethlehem intends to build two new Great Lakes ore ships which will have enough capacity to haul a total of 1,400,000 tons of ore and limestone per year.

The first shipment of ore from the company's Venezuelan mines is expected to reach this country in a few weeks and it is expected that this source will supply about 1,000,000 tons of ore this year and the yield will increase annually thereafter. Other ore reserves are to be tapped and the output of mines already producing is to be increased.

Also reported is the acquisition by Bethlehem of land along the St. Lawrence River which is said by a Bethlehem spokesman to be for mining purposes.

Bethlehem reports encouraging progress in their work on the beneficiating of low-grade taconite ores. At the Cornwall, Pa., plant the company has recently added pelletizing to the concentrating and sintering operations that have been under way for years.

Tech Background Wanted

Together with Pickands, Mather & Co., and Youngstown Sheet & Tube Co., Bethlehem hopes to have a technical background that will make possible the erection of a plant at Aurora, Minn., for the production of usable ore from these deposits, which is expected to produce some 2,500,000 tons a year.

CONTROLS *digest*

For more details see "You and Government Controls," The Iron Age, Jan. 4, 1951, p. 365. For full text of NPA regulations write U. S. Dept. of Commerce, Div. of Printing Service, Room 6225, Washington 25, D. C.

Order	Subject	Effective Date
NPA Reg. 1	Inventory Control	Sept. 18
Interpretation 1, 2, 3		Nov. 10
NPA Reg. 2	Priorities System	Oct. 3
Amendment 1, 2	DO Ratings	Oct. 3, Dec. 29
Delegation 1, 2, 3, 4	DO Ratings	Nov. 1, Nov. 2, Nov. 8
NPA Reg. 3	Priorities with Canada	Nov. 8
NPA M 1	Steel	Oct. 12
Amendment 1	Special programs	Oct. 26
Amendment 2	DO Lead Time	Dec. 1
Supplement 1	Freight car program	Oct. 26
Supplement 2	Great Lakes Ship program	Nov. 15
Supplement 3	Canadian freight cars	Dec. 15
NPA M 2	Rubber	Nov. 1
Amendment 1		Dec. 11
NPA M 3	Columbian steels	Oct. 19
NPA M 4	Construction	Oct. 27
Amendment 1, 2		Oct. 31, Nov. 15
NPA M 5	Aluminum	Oct. 27
NPA M 6	Steel warehouses	Nov. 8
Amendment 1, 2		Dec. 1, Dec. 15
NPA M 7	Aluminum use	Nov.13
Amendment 1		Dec. 1
Direction 1, 2, 3		Nov. 28, Dec. 16, Dec. 27
NPA M 8	Tin Inventories	Nov.13
Amendment 1		Dec. 18
NPA M 9	Zinc distribution	Nov. 16
NPA M 10	Cobalt stocks	Nov. 30
Amendment 1		Dec. 30
NPA M 11	Copper distribution	Nov. 29
NPA M 12	Copper use	Nov. 29
NPA M 13	Rayon	Dec. 1
NPA M 14	Nickel cutback	Dec. 1
NPA M 15	Zinc cutback	Dec. 1
NPA M 16	Copper scrap controls	Dec. 11
Amendment 1		Dec. 18
NPA M 17	Electrical components	Dec. 18
NPA M 18	Hog bristles	Dec. 21
NPA M 19	Cadmium	Jan. 1
NPA M 20	Scrap Inventory	Jan. 4
NPA M 21	Methylene Chloride	Jan. 11
NPA M 22	Aluminum Scrap	Jan. 12
ESA Reg. 1	Auto prices, wages	Dec. 18
NPA Notice 1	Hoarding	Dec. 27
NPA Delegation 5	Ores, Metals	Dec. 18

Conserve that Stainless!

IF you possess any stainless steel of doubtful parentage, now is the time to identify it. Most stainless alloying elements are scarce—some have reached the critical stage.

Any mixed supplies of stainless steels you have in stock have become precious, and well worth sorting out.

To help you, Frasse engineering service has recently revised and reissued our Data Chart, Sec. A No. 3—which describes 10 simple methods for separating stainless from carbon and alloy steels, nickel stainless from moly grades, straight chrome from chrome nickel grades, etc. A detailed explanation of each testing method is also included.

The chart is printed on durable cardboard stock, regular file card size, and can be filed, tacked on a wall, or slipped under glass for speedy reference.

A copy of this useful chart may be obtained by using the coupon below. Mail it today! *Peter A. FRASSE and Co., Inc., 17 Grand St., New York 13, N. Y. (Walker 5-2200) • 3911 Wissahickon Ave., Philadelphia 29, Pa. (Baldwin 9-9900) • 50 Exchange St., Buffalo 3, N. Y. (Washington 2000) • 157 Richmond Ave., Syracuse 4, N. Y. (Syracuse 3-4123) • Jersey City • Hartford • Rochester • Baltimore*

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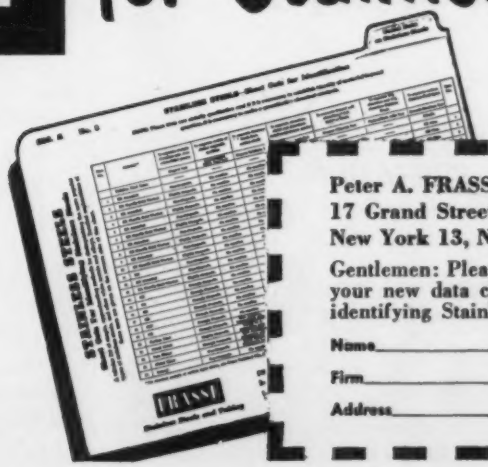

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Gentlemen: Please send me, without obligation, a copy of your new data chart, Sec. A No. 3—listing methods for identifying Stainless Steels.

Name_____ Title_____

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Address_____

Some Warehouses Snub Small Firms on Steel, Claims NPA Man

Washington—More and more complaints are coming in from small manufacturers that some steel warehouses refuse to sell more critical steel items except on DO ratings, wrote D. B. Carson, director of the Iron and Steel Div. of NPA, to Walter S. Doxsey, president of American Steel Warehouse Assn.

Mr. Carson said that deliberate withdrawal of products from the market by warehouses to sell only on rated orders and thus secure more steel is a violation of order M-6 and may force a revision of the order unless "the few warehouses that seek advantage" cease the practice.

Mr. Carson continued that the order was issued to provide "a flow of steel products through warehouses" to small consumers normally dependent on them. He said that these users do not yet have DO's to a great degree.

ESA, Steel Industry Meetings Yield Voluntary Price Controls

Washington—In the first action of its kind, Economic Stabilization Agency has given the green light to voluntary price stabilization for the iron and steel industry.

Officially, the action is a formal request by ESA that the industry freeze prices of major iron and steel items at Jan. 15 levels and not to raise prices without first giving ESA a 20-day notice.

Such a program had been worked out at meetings between representatives of the industry and ESA. The industry agreed to go along with the government providing that the Federal Trade Commission and Justice Dept. did not object. Both approved.

The established price would be the highest price in the 30 days before Jan. 15. The mills would not change customary price practices, such as price differentials, allowances, etc., in such a way as to increase the net return under the frozen price.

The 3 R's of Reliance Service

RELIANCE *Job-Fitted* **PRODUCTS AND SERVICES**

COLD ROLLED STRIP STEEL

Coils . . . Cut Lengths . . . All Tempers
Slit, Sheared, Deburred
and Round Edge
From WAREHOUSE
or
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SHEETS

Cold Rolled . . . Hot Rolled
Hot Rolled Pickled . . . Long Terne
Galvanized
Standard or production sizes
or cut to actual working
dimensions
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WAREHOUSE STOCKS

Big plants . . . .extensive processing, handling and shipping facilities . . . a widespread organization — all these things help make Reliance Service *resourceful* and *responsible*.

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In our case they spell 28 years of day-in and day-out specialized experience, living with and licking sheet and strip steel problems . . . knowing the possibilities as well as the limitations of our products . . . knowing how they can best fit your jobs.

DEPENDABLE DAN
OUR CUSTOMERS' MAN

Reliance Job Fitting Service is a way of doing business that works for you . . . whether steel is plentiful or scarce, in peace time or in war (either cold or hot).

STEEL—BACKBONE OF AMERICA'S ARMAMENT

For Immediate Action Call The Nearest Reliance Plant or Office:

DETROIT STEEL CORPORATION

PRODUCERS OF
Coke and Coal Chemicals • Pig Iron • Ingots
Slabs • Sheet Bars • Billets • Wire Rods
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DETROIT 9, MICHIGAN

RELIANCE STEEL DIVISION

Processors and Distributors JOB-FITTED Sheet and Strip Steel

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PLANTS

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DETROIT PLANT, 13770 Joy Road, WEbster 3-5866, Detroit 28, Mich.
EASTERN PLANT, State & Edmund Sts. (Hamden), New Haven 7-5781, New Haven 7, Conn.
MIDWEST PLANT, 1601 South Wolcott Ave., CAnal 6-2442, Chicago 8, Ill.

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GRAND RAPIDS 2, MICH., 326 Keeler Bldg., GLendale 6-3589
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JACKSON 18, MICH., 801 Reynolds Bldg., JAckson 3-3256
NEW YORK 19, N. Y., 250 West 57th St., COlumbus 5-4870
ST. LOUIS 8, MO., 4053 Lindell Blvd., LUcas 4550
TOLEDO 4, OHIO, 2114 Ohio Bldg., GArfield 8384
WORCESTER 4, MASS., 339 Main St., WOrcester 5-9806

Wheeling Builds Battery of 63 Coke Ovens at East Steubenville

Wheeling, W. Va. — Wheeling Steel Corp. is building a new battery of 63 coke ovens at its East Steubenville Works, an $8,750,000 project that will increase coke output from 120,000 tons to 145,000 tons per month.

The company also launched a new diesel-powered towboat, the *Capt. R. E. Reed*, at Decatur, Ala., where it was built by the Ingalls Ship Building Corp. The $96,000 boat replaces the *D. A. B.*, wrecked against a dam near Harmarville, Pa., last summer after the crew had rescued four persons from a yacht that had plunged over the dam. The boat will be used to push coal barges down the Allegheny and Ohio rivers to the plant.

Koppers Co. will build the coke ovens. Wheeling Steel now operates 251 units. To handle increased coal requirements, ten new coal barges will be added to the present fleet of 83.

U. S. Steel Ingot Capacity Up Sharply in Principal Areas

Pittsburgh—U. S. Steel Corp. ingot capacity in the Pittsburgh, Youngstown, and Chicago districts is up 1,661,600 tons over last year. Total capacity in these areas now tops 24,340,000 tons.

Pittsburgh area capacity is up 1,064,700 tons, Chicago 456,900 tons, and Youngstown 140,000.

This expansion was accomplished through enlargement of existing melting facilities, plus installation of modern, more efficient, and larger handling facilities and use of more iron ore sinter.

Belt Speeds Coal from Mine

Waltonville, Ill.—The world's highest lift conveyer belt has been installed here in a mine of the Chicago, Wilmington & Franklin Coal Corp. The belt, moving 7 miles per hour, can carry 1200 tons of coal an hour up a 3290 ft slope. A 1500 hp electric motor drives the head pulley.

• *News of Industry* •

Pittsburgh Steel, Allegheny Ludlum Merger Decision Expected

Stockholders may vote in spring . . . Firms look each other over.

Pittsburgh — Merger of Allegheny Ludlum Steel Corp. and Pittsburgh Steel Co. is a distinct probability.

The two companies have inspected each other's facilities and have held formal discussions of terms. The decision, one way or another, will be made within a relatively short time. The question may be put to stockholders this spring.

Both companies are taking a good look at each other's financial structure and profit potential. Even advertising techniques of each company are being examined.

There would be no necessity to seek Dept. of Justice approval for the merger. The products produced by the companies conflict, so there would be no question of competition.

A Sensible Merger

The merger would be logical. Allegheny Ludlum is a leading producer of stainless and other alloy steels, plus a relatively small tonnage of carbon strip. It is semi-integrated and depends on others for its pig iron. Pittsburgh Steel is integrated, produces carbon seamless tubing and wire products, and will shortly enter the flat-rolled sheet and strip field for the first time.

Pittsburgh Steel has an excess of production, Allegheny Ludlum an excess of finishing facilities. At the present time, Pittsburgh Steel is selling part of the 950,000 tons of pig iron it produces annually in the open market.. It is protected on iron ore.

Pittsburgh's present ingot capacity of 1,072,000 tons will shortly be increased to 1,560,000 tons. Allegheny Ludlum's ingot capacity is about 830,000 tons. Both companies have been expanding and modernizing their plants. Principal operations of both concerns are situated in western Pennsylvania.

Scrap Committee, NPA Discuss Ways to Get More Scrap for War

Washington — Estimates that iron and steel scrap needs in 1951, year of expanded defense output, will surpass 1950 requirements of 29,700,000 tons by 3 million tons, prompted discussions between NPA and the Iron and Steel Scrap Industry Advisory Committee on methods to stimulate scrap.

Industry spokesman indicated that a concerted program will be needed to tap new scrap sources to meet the increased needs. The committee recommended securing more scrap from junked ships, release of obsolete machinery, recovery of street rails, recovery of metal from slag dumps, and a conservation program.

Ford to Build Rouge Coke Ovens

Detroit—Ford Motor Co. plans to open construction of 37 additional coke ovens at its Rouge plant. When the ovens are completed in late 1951, new capacity will be 1,430,000 tons annually. The ovens will furnish coke for new Ford foundry facilities being built at Cleveland and Rouge.

Ford also plans a coke screening plant and modernization of its coke byproducts plant.

Raise Steel Order Ceilings

Washington — Detailed changes were contained in an amendment to NPA M-1 issued this week, effective Jan. 22. Most percentage ceilings for acceptance of rated steel orders were raised, specific inventory controls at both production and consumption level were provided. Some ferrous products were added to the order and lead time of some items was changed.

A 45-day inventory is set for steel products and malleable and gray iron castings, while the maximum for pig iron is set at 30 days or a minimum working level. Percentage ceilings for acceptance of DO rated orders were also changed.

Seek NPA Aid in Chrome Shipping

Washington — NPA was asked last week to help break shipping bottlenecks in chrome ore imports.

Representatives of the ferrochromium industry told NPA that expansion of their industry is well under way but production is hampered by difficulties in obtaining ore. Also, the industry is having difficulties in obtaining machinery and equipment.

In particular, the industry recommended that the ore pier at Beira, Africa, be set aside for handling chrome ore.

Expand Volta Redonda Capacity

Sao Paulo—Capacity of Volta Redonda, Brazil's pride and joy in steelmaking, will be expanded by 150,000 tons. Last year the mill produced 300,000 tons of steel, bettering 1949 output by about 75,000 tons.

Now under construction are a new blast furnace, two openhearths, 21 coal chambers, and new rolling mill units. The mill now provides about 35 pct of Brazil's steel needs.

Alcoa Anti-Trust Suit Ended

New York — The 14-year-old anti-trust suit against Aluminum Co. of America was ended this week when Federal Judge John C. Knox accepted a stock disposal plan submitted by shareholders of Alcoa and Aluminum, Ltd., of Canada. Under the plan Alcoa shareholders will sell their holdings in the Canadian company over a 10-year period.

Mobile Plant Buys Local Foundry

Mobile, Ala. — The Pullman Stove & Pulley Mfg. Co. has purchased the foundry of Waterman Steamship Co. here.

The property consists of seven buildings on a 25-acre tract. It was used to supply Waterman Shipbuilding Corp., a subsidiary. The shipbuilding company will continue to obtain its requirements from the foundry.

STEEL CONSTRUCTION NEWS

Fabricated steel awards this week included the following:

650 **Tons,** Philadelphia, warehouse for Frankford Grocery Co., to Bethlehem Steel Co., Bethlehem.

600 **Tons,** Salem, Mass., coal handling plant for New England Power Service Co. through William T. Donovan Co., Salem, to A. O. Wilson Structural Steel Co., Cambridge, Mass.

420 **Tons,** Dorchester, Mass., new Carney Hospital (now situated in South Boston, Mass), to A. O. Wilson Structural Steel Co., Cambridge, Mass.

210 **Tons,** Tolland, Conn., two span girder bridge, grading and drainage on Wilbur Cross Highway. Enfield Construction Co., Thompsonville, Conn., low bidder.

150 **Tons,** Philadelphia, Widener Memorial School, to Bethlehem Steel Co., Bethlehem.

Reinforcing bar awards this week included the following:

2000 **Tons,** Paducah, Ky., Powerhouse, to Concrete Steel Co.

1000 **Tons,** Evergreen Park, Ill., shopping center, to Ceco Steel Products Co., Chicago.

835 **Tons,** Milwaukee, Alverno College, to Ceco Steel Products Co., Chicago.

660 **Tons,** Eastlake, Ohio, Cleveland and Electric Illuminating Co., to U. S. Steel Supply Co.

650 **Tons,** Chicago, Harris Trust Bank vault, to Joseph T. Ryerson and Son, Chicago.

650 **Tons,** Chicago, Racine Avenue Pumping station sanitary district, to U. S. Steel Supply Co., Chicago.

500 **Tons,** Marietta, Ohio, Electro Metallurgical-Union Carbon and Carbide Co., to Bethlehem Steel Co.

375 **Tons,** Westville, Ind., hospital, to U. S. Steel Supply Co., Chicago.

315 **Tons,** Cincinnati, Beechmont Levy, to Pollak Steel Co., Cincinnati.

205 **Tons,** Gary, Ind., Municipal Court and Jail, to Olney J. Dean Co., Chicago.

200 **Tons,** Shelby, Ohio, Shelby Mutual Insurance building, to Pollak Steel Co., Cincinnati.

200 **Tons,** Wayne County, Ohio, project 540, to Pollak Steel Co., Cincinnati.

200 **Tons,** Meigs and Athens Counties, Onio, project 519, to Truscon Steel Co.

175 **Tons,** Dayton, Oakview School, to Truscon Steel Co.

157 **Tons,** Freeport, Maine, project on Route 1, extending around Freeport Village. W. H. Hinman, Inc., North Anson, Maine, low bidder.

150 **Tons,** Tiffin, Ohio, American Radiator and Standard Sanitary Co., to U. S. Steel Supply Co.

140 **Tons,** Akron, Ohio, state highway project 492, to U. S. Steel Supply Co.

120 **Tons,** Chicago, International Harvester Co. vocational school, to Joseph T. Ryerson and Son, Chicago.

100 **Tons,** Detroit, annealing furnace, Ford Motor Co., to U. S. Steel Supply Co.

Reinforcing bar inquiries this week included the following:

1300 **Tons,** Chicago, Veterans Administration regional office and clinic building No. 11.

1200 **Tons,** Cincinnati, U. S. Engineers job.

600 **Tons,** Chicago, Twin Towers Apts.

335 **Tons,** Saginaw, Mich., sewage treatment plant.

290 **Tons,** Cleveland, St. Charles Hospital.

250 **Tons,** Detroit, U. S. Rubber Co. warehouse.

190 **Tons,** Blue Island, Ill., Illinois Bell Telephone Co.

170 **Tons,** Arlington Heights, Ill., Illinois Bell Telephone Co.

125 **Tons,** Chicago, administration building, Millers National Insurance Co.

100 **Tons,** Elmhurst, Ill., York community high school.

Cuba Nicaro Plant Reopening To Give U. S. 15 Pct More Nickel

Washington — Nickel supplies for the United States are seen as being increased by more than 15 pct by the end of the year when the Nicaro nickel plant in Cuba is reactivated.

The General Services Administration last week signed an agreement by which the Mining Equipment Corp. of New York will operate the plant after it is put in operating condition by the Frederick A. Snare Corp. at a cost of $5 million. The latter built the plant for the government in 1942. It has been inactive since 1947.

The rated capacity of the Nicaro works when constructed in 1942 was 43 million lb of high grade nickel oxide which would work out to about 32 million lb of nickel.

Transportation Facilities

The Nicaro plant includes rail and port terminals and more than 30 industrial type buildings including a reduction furnace building, wet ore building, and a large machine shop. The power plant has six 1500 kw and one 3000 kw generating units.

A pilot plant will also be built where research facilities will be turned toward development of a new process for producing cobalt as a by-product. The process is also expected to increase the nickel recovery rate.

Although the operating company is a subsidiary of the Dutch firm N. V. Billiton Maatschappij, all the output will be taken by the U. S. government. Operation will be on a fee basis which is expected to produce nickel oxide at about 40¢ a lb of contained nickel.

IRON AGE *markets and prices*

market briefs and bulletins

financing contracts—Methods of financing defense contracts and getting V-type loans were given by the Defense Dept. In order of military preference the financing procedures are: private lending, partial and progress payments, V-loans, and advance payment by the contracting agency. V-type loans will be authorized when defense contractors need financing in excess of what private lenders consider a normal risk. Branches of the armed services may guarantee the excess. Banks or financing agencies prepare the loan and send it to the interested military agency through the district Federal Reserve Bank.

farm priority—A program to take care of needs of farm equipment industry is being worked out. Members of the farm machinery industry have reported that they will be operating at a rate of 60 to 65 pct of that of last year by next June if they do not get help. The Agricultural Dept. is calling for a farm program equal to or greater than that of 1950.

Jorgensen invades midwest—Earl E. Jorgensen Co., steel distributors in Los Angeles and Oakland, Calif., and Dallas and Houston, Tex., will reverse the East to West trend by establishing facilities in Chicago. A site has been purchased and construction of a new warehouse will start soon.

steel for autos—Auto producers are aware they face a losing fight to keep production up. The industry will do well if it comes out of the first half of 1951 with 75 to 80 pct of its 1950 rate of output. For the second half of 1951, the guesses are now 50 to 60 pct of the 1950 rate, and the rate may go lower than this.

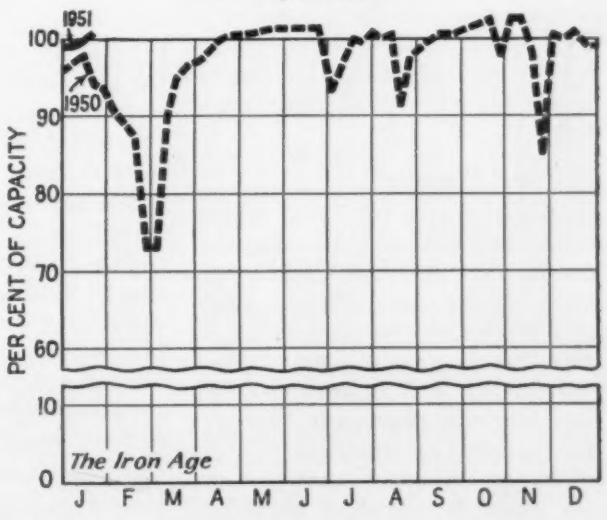
to handle products—Bethlehem Supply Co., Tulsa, Okla., has completed an agreement with Tube Turns, Inc., of Louisville, Ky., to distribute the latter's products to the petroleum industry in California.

expansion—Great Lakes Steel Corp. has opened construction on a fourth blast furnace on Zug Island and several of its openhearths are being rebuilt to raise capacity from 250 to 500 tons. The firm was granted a certificate of necessity for $42,833,800 recently. When the present program is finished in 1952, annual ingot capacity will be increased from the present 2.4 million tons to 3.6 million. Finishing capacity is also growing. Cold-rolled capacity is expected to reach 200,000 tons a month.

fluorspar—Oglebay Norton & Co. has announced increases in the price of metallurgical grade fluorspar effective Jan. 15, as follows: Less than 60 pct, $40; 70 pct or more, $43.

Kaiser at Permanente—Kaiser interests are investing approximately $1,700,000 to get its ferro-silicon plant at Permanente, Calif., in full production and to develop and enlarge its dolomite operations.

Steel Operations**



District Operating Rates—Per Cent of Capacity**

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Jan. 14	98.0*	101.0	96.0*	97.0*	103.8	104.0	97.0*	106.0	100.0	106.0	90.5	95.1	117.2	99.5
Jan. 21	96.0	100.5	95.5	99.0	106.7	104.0	98.0	106.0	101.0	106.0	91.0	95.1	111.3	101.0

* Revised.
** Beginning Jan. 1, 1951, operations are based on an annual capacity of 104,229,650 net tons.

nonferrous metals

outlook and market activities

NONFERROUS METALS PRICES

	Jan. 17	Jan. 18	Jan. 19	Jan. 20	Jan. 22	Jan. 23
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake, delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.76	$1.7575	$1.755	....	$1.76	$1.77*
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	16.80	16.80	16.80	16.80	16.80	16.80

Note: Quotations are going prices.

*Tentative.

by R.Hatschek

New York — Prices dipped slightly on secondary aluminum ingots last week. The revision was from ¼¢ to ½¢ downward on most items. The reason behind this reduction is a slightly easier tone in the market for aluminum scrap.

Some of the secondary brass and bronze ingots also underwent a price revision last week. High tin alloys were boosted from ¼¢ to as much as 11¢ per lb because of the actions of the tin market. Other alloys were quoted fractionally lower because of increased availability of some scrap materials.

Still Wait Controls

Dealers' buying prices for scrap metals are generally unchanged, though the aluminum market is softer, as the trade awaits action from Washington on the price controls they know are coming. The replacement of Alan Valentine by Eric Johnston practically assures this in the near future.

The conscientious members of the scrap trade want controls. They point out that, while the majority would like to hold prices voluntarily, it is difficult to turn down higher offers when they see some of their competitors taking in higher prices.

The Spanish export price of mercury has been increased another $40 to $200 per flask, f.o.b. Spain. This latest increase brings the New York price up to $225 per 76-lb flask. The New York price at the start of hostilities in Korea was in a range of $70 to $71 per flask, at which price the Spaniards had undersold domestic producers and forced them out of the market. Then they started putting the price where they wanted it.

This new price, more than three times as high as it was only 7 months ago, is creating havoc in the U. S. market for mercury and little, if any, business had been transacted at the new record-high level as we went to press.

Mining Equipment Corp., of New York, is going to operate the Cuban Nicaro nickel plant. The plant, which has a capacity of about 30 million lb of nickel oxide per year, is expected to start producing within a year and all the output is slated for stockpiles.

News from Washington has it that the National Production Authority is planning to cut out all non-essential civilian uses of aluminum in an order similar to the one recently issued controlling the end-use of copper. This order is expected to be issued shortly and become effective on April 1.

Further NPA regulations governing inventories and end-uses of other ferrous and nonferrous metals are also in the works. Tin, antimony, nickel, tungsten, molybdenum and zinc are all slated for more stringent control.

To Add More Magnesium

General Services Administration has announced plans for the reactivation of the Velasco, Tex., and Manteca, Calif., government-owned magnesium plants. This is in addition to the previously announced reactivation of the plants at Wingdale, N. Y.; Canaan, Conn., and Painesville, Ohio, and will boost the nation's magnesium production some 200,000,000 lb over the next 2 years.

Dow Chemical Corp. will operate the Texas plant and Kaiser Aluminum & Chemical Co. will operate the one in California. Cost to the government will be $3,075,000 for the Velasco operations and $700,000 for the other.

Early this week National Lead Co. boosted the price of antimony 10¢ to 41 to 42¢ per lb, f.o.b. Laredo for R. M. M. brand. This was preceded by the announcement that the Bradley Mining Co. had resumed production and set up a price of 50¢ per lb, f.o.b. Cascade, Idaho. Bradley also set a price of 45¢ per lb for antimony oxide, also f.o.b. Cascade.

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate: ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 66.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 26, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 43.5¢; cold-finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 29.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63S-T5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.142; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.024 in. x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in., $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 28.2¢ per lb.; 0.024 in. x 28 in., 26.9¢ per lb.

Magnesium

(F.o.b. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in. 63¢; 3/16 in. 65¢; ⅛ in. 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. Base: 10,000 lb.

Extruded Round Rod: M, diam in., ⅛ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 6 in., 48.5¢. Other alloys higher. Base: Up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 4 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 85¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 4 in. and larger, 30,000 lb.

Titanium

(10,000 lb. base, f.o.b. mill)

Commercially pure and alloy grades: Sheet and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	71½	57
Strip, cold-rolled	77½	60
Rods and bars	67½	55
Angles, hot-rolled	67½	55
Plates	69½	56
Seamless tubes	100½	90
Shot and blocks		50

Copper, Brass, Bronze

(Freight prepaid on 200 lb includes duty)

	Sheets	Rods	Extruded Shapes
Copper	41.03	....	40.63
Copper, h-r	....	36.88	....
Copper, drawn	....	38.18	....
Low brass	39.15	38.84	....
Yellow brass	38.28	37.97	....
Red brass	40.14	39.83	....
Naval brass	43.08	38.61	38.07
Leaded brass	....	32.63	36.70
Com'l bronze	41.13	40.82	....
Mang. bronze	45.96	40.65	41.41
Phos. bronze	60.20	60.45	....
Muntz metal	40.43	36.74	37.99
Ni silver, 10 pct	49.27	51.49	....
Arch. bronze	....	....	35.11

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	42.00
Beryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$2.10 to $2.17
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$200
Lead, St. Louis	16.80
Lead, New York	17.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb	24.50
Magnesium, sticks, 100 to 500 lb	42.00 to 44.00
Mercury, dollars per 76-lb flask f.o.b. New York	$225.00
Nickel, electro, f.o.b. New York	53.55
Nickel oxide sinter, f.o.b. Copper Cliff, Ont., contained nickel	46.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	90.16
Tin, New York	$1.77
Titanium, sponge	$5.00
Zinc, East St. Louis	17.50
Zinc, New York	18.22
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	29.00
No. 120	28.50
No. 123	28.00
80-10-10 ingot	
No. 305	35.00
No. 315	32.00
88-10-2 ingot	
No. 210	46.25
No. 215	43.25
No. 245	36.00
Yellow ingot	
No. 405	25.00
Manganese bronze	
No. 421	29.75

Aluminum Ingot

(Cents per lb, 30,000 lb lots)

95-5 aluminum-silicon alloys	
0.30 copper, max.	33.25-34.25
0.60 copper, max.	33.00-34.00
Piston alloys (No. 122 type)	30.50-31.00
No. 12 alum. (No. 2 grade)	30.00-30.50
108 alloy	30.25-30.75
195 alloy	31.25-31.75
13 alloy	33.50-34.00
ASX-679	30.50-31.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	32.00-32.50
Grade 2—92-95%	30.25-30.75
Grade 3—90-92%	29.25-29.75
Grade 4—85-90%	28.75-29.25

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	39½
Electrodeposited	33¾
Rolled, oval, straight, delivered	38¾
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	24¾
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	70.50
Rolled, depolarized	71.50
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79½

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	52.15
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz.	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drums	45.35

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	23	22½
Yellow brass	20¼	18¾
Red brass	21½	20¾
Comm. bronze	21¾	21
Mang. bronze	19½	18¾
Brass rod ends	19¾	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	21.50
No. 2 copper wire	20.00
Light copper	19.00
Refinery brass	19.50*
Radiators	15.00

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	23.00
No. 2 copper wire	22.00
Light copper	21.00
No. 1 composition	22.00
No. 1 comp. turnings	21.50
Rolled brass	18.50
Brass pipe	20.50
Radiators	17.50
Heavy yellow brass	17.00
Aluminum	
Mixed old cast	18½—19
Mixed new clips	20½
Mixed turnings, dry	18½
Pots and pans	18½—19
Low copper	21½—22

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	19½—20
No. 2 heavy copper and wire	18 —18½
Light copper	17 —17¼
New type shell cuttings	17 —17¼
Auto radiators (unsweated)	14½—15
No. 1 composition	17 —17⅛
No. 1 composition turnings	16½—17
Clean red car boxes	15½—16
Cocks and faucets	15½—16
Mixed heavy yellow brass	13 —13½
Old rolled brass	14 —14½
Brass pipe	17 —17⅛
New soft brass clippings	17½—18
Brass rod ends	16½—17
No. 1 brass rod turnings	16 —16½

Aluminum

Alum. pistons and struts	12 —13
Aluminum crankcases	15 —16
2S aluminum clippings	18½—19½
Old sheet and utensils	15 —16
Borings and turnings	12½—13
Misc. cast aluminum	15 —16
Dural clips (24S)	15 —16

Zinc

New zinc clippings	14½—15
Old zinc	11 —11¼
Zinc routings	8½— 9
Old die cast scrap	8 — 8¼

Nickel and Monel

Pure nickel clippings	60 —65
Clean nickel turnings	57 —60
Nickel anodes	60 —65
Nickel rod ends	60 —65
New Monel Clippings	22 —25
Clean Monel turnings	18 —20
Old sheet Monel	20 —22
Inconel clippings	26 —28
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13

Lead

Soft scrap, lead	15 —15¼
Battery plates (dry)	8¾— 9

Magnesium

Segregated solids	9 —10
Castings	6½— 6½

Miscellaneous

Block tin	90 —100
No. 1 pewter	63 —65
No. 1 auto babbitt	58 —60
Mixed common babbitt	12¼—12½
Solder joints	18½—19
Siphon tops	58 —60
Small foundry type	16¼—16½
Monotype	14¾—15
Lino. and stereotype	14½—14¾
Electrotype	12¾—13
Hand picked type shells	11½—11¾
Lino. and stereo. dross	3 — 3½
Electro. dross	6½— 6¾

SCRAP *iron and steel*

markets
prices
trends

Scrap men talk over ESA-bolstered rumor of price controls on scrap this week . . . Some areas report buying, others don't.

Scrap men were trading rumors this week on the immediate imminence of a deep freeze on scrap prices. All the expectant buzzing in the field centered around a popular rumor that price controls were here, were coming tomorrow —or at any rate were due this week. The rumor was bolstered by an ESA statement that the order would go through this week after a few legal wrinkles had been ironed out. At press time the chill had not arrived but it was a short step to the brink.

Mills in some districts were buying right down to what seemed the controls deadline. Others, looking over their shoulders at higher scrap stocks, slowed up buying and waited for the price freeze and lower prices. In some markets, the price line was held. In others all sorts of upward surges were registered. So far, the formula was hurdled in Buffalo, Philadelphia, New York, Youngstown, and Boston. It proved that necessity could upset the best-laid plans and get ESA's dander up.

It was felt in Pittsburgh that, to be effective, the government would have to slap controls on the market immediately and that the order must specify that contracts in which the formula was scrapped be declared invalid.

PITTSBURGH—Mills here are holding out against higher prices in the hope of quick control action in Washington. To do any good, controls must be slapped on almost immediately, and any such order must specify that contracts in other areas where the so-called "formula" was tossed out not be completed. Otherwise consumers here would be starved while the higher priced orders were completed. To bring scrap in from the East, local mills would have to pay $56 to $57. Meanwhile, little if any business is being transacted. Machine shop turnings were up 50¢.

CHICAGO—The scrap market here was stronger last week although no new mill buying of openhearth grades was evident. Reaction to higher prices paid in the eastern districts, diminishing dealer inventories and the need for completing unfilled orders were factors adding strength to the market. Brokers are paying $45 and over to fill old orders for No. 1 heavy melting steel and reports have been heard of offerings over the formula for scrap to be shipped out of the area. Some foundries, unable to hold off any longer, are coming into the market and finding higher prices still prevailing.

PHILADELPHIA—Following last week's increases, blast furnace grades of scrap are $2 per ton higher this week. Broker buying on railroad lists is very careful and some brokers were surprised to get scrap on their conservative bids. No. 1 heavy melting and No. 1 bundles were incorrectly quoted last week although some small consumers are buying at those prices. Correct price for last week and this week is $47 to $48.

NEW YORK—The trade here felt the force of heavy buying. Need offset the desire to wait out imminent controls and lower prices. Last week the formula cracked down the middle and the price of No. 1 heavy jumped to as high as $44. All steelmaking grades hit the road up but there were some reports that the turnings group was softening.

DETROIT—With price controls just around the corner, no changes are being reported in Detroit scrap prices this week. However, the tone of the market continues strong. Reports of free scrap purchases in small tonnages as much as $7 over the No. 1 electric furnace bundle price continue to come in. The reason these sales are not reflected in the price spread is the small volume of scrap involved and belief that price controls are imminent. Despite occasional reports of a soft gray iron market, there have been actual sales of representative material here during the past week at the prices quoted.

CLEVELAND—The scrap market was running wild here and in the Valley at press time. Unofficially, the fireworks started last Thursday, when some Valley consumers began meeting competition from adjacent districts in the intermediate points. At least one major Valley consumer is paying $51.50 for No. 1 heavy melting steel locally, and $52.50 including springboards, for remote No. 1, in representative tonnages. Small remote tonnages of No. 1 have brought $55, including springboards.

ST. LOUIS—While there has been some buying of scrap iron in the St. Louis industrial district at prices higher than the formula, it has been mostly by smaller operators. The formula is being generally observed so that prices are unchanged. Steel mills inventories are said to be low.

BIRMINGHAM—Owners of scrap who have been holding for higher prices now are attempting to sell everything they have in anticipation of a price rollback. The result is that scrap outside the immediate Birmingham district is moving north, where mills are taking practically everything offered. Scrap in the Birmingham district is moving to Republic's plant at Alabama City. Atlantic Steel, with a large supply on hand, has stopped buying.

CINCINNATI—Despite an epidemic of high prices in other districts, the market here was unchanged from last week. A certain amount of raiding is going on, but local brokers have not yet been authorized by the mills to meet the competition.

BOSTON—Steelmaking grades in the local market moved up $4 per ton with some sales of No. 1 heavy melting reported as high as $42. The market was very active with buyers and sellers trying to protect their positions before controls.

BUFFALO—Dealers who sold steelmaking scrap at $5.75 to $6.75 a ton above formula report little material has moved against orders as supplies continue to shrink. Mills reserve stocks have been hit hard to maintain output. A definite shortage was reported in receipts.

WEST COAST—The California market broke loose this week with tonnages of No. 1 heavy melting moving at prices up to $34 a ton. Railroad scrap was outstanding with sales ranging to $46 for No. 1 railroad heavy melting. Roads with trans-continental connections have found they can haul their scrap in otherwise empty freight cars to Chicago and obtain the current higher price there.

Iron and Steel

SCRAP PRICES

Going prices as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$45.75 to $46.50
No. 2 hvy. melting	43.75 to 44.50
No. 1 bundles	45.75 to 46.50
No. 2 bundles	42.75 to 43.50
Machine shop turn.	38.25 to 39.00
Mixed bor. and ms. turns.	38.25 to 39.00
Shoveling turnings	39.75 to 40.50
Cast iron borings	39.75 to 40.50
Low phos. plate	56.00 to 56.50
Heavy turnings	46.50 to 47.00
No. 1 RR. hvy. melting	45.75 to 46.50
Scrap rails, random lgth.	64.50 to 65.00
Rails 2 ft and under	68.00 to 69.00
RR. steel wheels	63.00 to 64.00
RR. spring steel	63.00 to 64.00
RR. couplers and knuckles	63.00 to 64.00
No. 1 machinery cast	67.50 to 68.00
Mixed yard cast.	57.50 to 58.00
Heavy breakable cast	52.50 to 53.00
Malleable	71.00 to 72.00

Chicago

No. 1 hvy. melting	$44.25 to $45.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 factory bundles	44.00 to 45.00
No. 1 dealers' bundles	44.00 to 45.00
No. 2 dealers' bundles	41.00 to 42.00
Machine shop turn.	36.00 to 37.00
Mixed bor. and turn.	36.00 to 37.00
Shoveling turnings	37.00 to 38.00
Cast iron borings	37.00 to 38.00
Low phos. forge crops	54.00 to 55.00
Low phos. plate	52.00 to 53.00
No. 1 RR. hvy. melting	47.00 to 48.00
Scrap rails, random lgth.	62.00 to 63.00
Rerolling rails	65.50 to 66.50
Rails 2 ft and under	67.00 to 69.00
Locomotive tires, cut	58.00 to 59.00
Cut bolsters & side frames	54.00 to 55.00
Angles and splice bars	63.00 to 64.00
RR. steel car axles	95.00 to 100.00
RR. couplers and knuckles	58.00 to 59.00
No. 1 machinery cast.	62.00 to 64.00
No. 1 agricul. cast.	58.00 to 60.00
Heavy breakable cast.	53.00 to 55.00
RR. grate bars	48.00 to 49.00
Cast iron brake shoes	52.00 to 53.00
Cast iron car wheels	58.00 to 59.00
Malleable	78.00 to 82.00

Philadelphia

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 bundles	47.00 to 48.00
No. 2 bundles	42.00 to 43.00
Machine shop turn.	38.00 to 39.00
Mixed bor. and turn.	37.00 to 38.00
Shoveling turnings	40.00 to 41.00
Low phos. punchings, plate	51.00 to 52.00
Low phos. 5 ft and under	51.00 to 52.00
Low phos. bundles	50.00 to 51.00
Hvy. axle forge turn.	45.00 to 46.00
Clean cast chem. borings	44.00 to 45.00
RR. steel wheels	56.00 to 57.00
RR. spring steel	56.00 to 57.00
Rails 18 in. and under	66.00 to 67.00
No. 1 machinery cast.	62.00 to 63.00
Mixed yard cast.	53.00 to 55.00
Heavy breakable cast.	53.00 to 54.00
Cast iron carwheels	67.00 to 68.00
Malleable	70.00 to 72.00

Cleveland

No. 1 hvy. melting	$51.00 to $52.00
No. 2 hvy. melting	49.00 to 50.00
No. 1 busheling	51.00 to 52.00
No. 1 bundles	51.00 to 52.00
No. 2 bundles	48.00 to 49.00
Machine shop turn.	43.00 to 44.00
Mixed bor. and turn.	45.00 to 46.00
Shoveling turnings	45.00 to 46.00
Cast iron borings	45.00 to 46.00
Low phos. 2 ft and under	53.50 to 54.50
Steel axle turn.	50.00 to 51.00
Drop forge flashings	51.00 to 52.00
No. 1 RR. hvy. melting	51.50 to 52.00
Rails 3 ft and under	70.00 to 71.00
Rails 18 in. and under	72.00 to 73.00
No. 1 machinery cast.	69.00 to 70.00
RR. cast.	71.00 to 72.00
RR. grate bars	50.00 to 51.00
Stove plate	55.00 to 56.00
Malleable	76.00 to 77.00

Youngstown

No. 1 hvy. melting	$51.50 to $52.50
No. 2 hvy. melting	49.50 to 50.50
No. 1 bundles	51.50 to 52.50
No. 2 bundles	$48.50 to $49.50
Machine shop turn	43.50 to 44.50
Shoveling turnings	45.50 to 46.50
Cast iron borings	45.50 to 46.50
Low phos. plate	54.00 to 55.00

Buffalo

No. 1 hvy. melting	$51.25 to $52.00
No. 2 hvy. melting	49.25 to 50.00
No. 1 bushelings	49.25 to 50.00
No. 1 bundles	50.25 to 51.00
No. 2 bundles	47.25 to 48.00
Machine shop turn.	43.25 to 44.00
Mixed bor. and turn.	43.25 to 44.00
Shoveling turnings	45.25 to 46.00
Cast iron borings	43.25 to 44.00
Low phos. plate	51.25 to 52.00
Scrap rails, random lgth.	55.00 to 56.00
Rails 2 ft and under	60.00 to 61.00
RR. steel wheels	60.00 to 61.00
RR. spring steel	60.00 to 61.00
RR. couplers and knuckles	60.00 to 61.00
No. 1 machinery cast.	59.00 to 60.00
No. 1 cupola cast.	54.00 to 55.00
Small indus. malleable	60.00 to 61.00

Birmingham

No. 1 hvy. melting	$42.50 to $43.50
No. 2 hvy. melting	40.50 to 41.50
No. 2 bundles	39.50 to 40.50
No. 1 busheling	40.50 to 41.50
Machine shop turn.	34.00 to 35.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	33.00 to 34.00
Bar crops and plate	47.00 to 48.00
Structural and plate	46.00 to 47.00
No. 1 RR. hvy. melting	43.00 to 44.00
Scrap rails, random lgth.	58.00 to 59.00
Rerolling rails	61.00 to 62.00
Rails 2 ft and under	66.00 to 67.00
Angles & splice bars	59.00 to 60.00
Std. steel axles	61.00 to 62.00
No. 1 cupola cast.	54.00 to 55.00
Stove plate	49.00 to 50.00
Cast iron carwheels	46.00 to 47.00

St. Louis

No. 1 hvy. melting	$43.75 to $44.50
No. 2 hvy. melting	41.75 to 42.50
No. 2 bundled sheets	40.75 to 41.50
Machine shop turn.	33.75 to 34.75
Shoveling turnings	36.50 to 37.50
Rails, random lengths	49.00 to 50.00
Rails 3 ft and under	62.00 to 63.00
Locomotive tires, uncut	50.00 to 51.00
Angles and splice bars	59.00 to 60.00
Std. steel car axles	90.00 to 95.00
RR. spring steel	53.00 to 54.00
No. 1 machinery cast.	55.00 to 56.00
Hvy. breakable cast.	48.00 to 49.00
Cast iron brake shoes	53.00 to 54.00
Stove plate	45.00 to 47.00
Cast iron car wheels	60.00 to 62.00
Malleable	55.00 to 57.00

New York

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting	$42.00 to $44.00
No. 2 hvy. melting	.... 40.00
No. 2 bundles	.... 39.00
Machine shop turn.	32.00 to 34.00
Mixed bor. and turn.	32.00 to 34.00
Shoveling turnings	34.00 to 36.00
Clean cast chem. bor.	40.00 to 41.00
No. 1 machinery cast.	52.00 to 53.00
Mixed yard cast.	47.00 to 48.00
Charging box cast.	47.00 to 48.00
Heavy breakable cast.	47.00 to 48.00
Unstrp. motor blocks	42.00 to 43.00

Boston

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting	$35.67 to $42.00
No. 2 hvy. melting	33.67 to 37.67
No. 1 bundles	38.00 to 42.00
No. 2 bundles	$32.67 to $36.67
Machine shop turn.	.. 27.67
Mixed bor. and turn.	$26.67 to 27.67
Shoveling turnings	.. 29.67
No. 1 busheling	.. 35.67
Clean cast chem. borings	35.00 to 36.00
No. 1 machinery cast.	48.00 to 49.00
Mixed cupola cast.	45.00 to 46.00
Heavy breakable cast.	42.00 to 43.00
Stove plate	42.00 to 43.00

Detroit

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting	.. $40.25
No. 2 hvy. melting	.. 38.25
No. 1 bundles, openhearth	.. 40.25
No. 1 bundles, electric furnace	.. 42.75
New busheling	.. 40.25
Flashings	.. 40.25
Machine shop turn.	.. 32.25
Mixed bor. and turn.	.. 32.25
Shoveling turnings	.. 34.25
Cast iron borings	.. 34.25
Low phos. plate	.. 42.75
No. 1 cupola cast.	$54.00 to 56.00
Heavy breakable cast.	45.00 to 47.00
Stove plate	44.00 to 46.00
Automotive cast.	58.00 to 60.00

Cincinnati

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	.. $44.25
No. 2 hvy. melting	.. 42.25
No. 1 bundles	.. 44.25
No. 2 bundles, black	.. 42.25
No. 2 bundles, mixed	.. 41.25
Machine shop turn.	.. 33.00
Mixed bor. and turn.	.. 34.00
Shoveling turnings	.. 34.00
Cast iron borings	.. 34.00
Low phos.-steel	.. 46.75
Low phos. 18 in. under	.. 42.00
Rails, random lengths	$62.00 to 63.00
Rails, 18 in. and under	72.00 to 73.00
No. 1 cupola cast.	65.00 to 66.00
Hvy. breakable cast.	59.00 to 60.00
Drop broken cast.	71.00 to 72.00

San Francisco

No. 1 hvy. melting	$30.00 to $34.00
No. 2 hvy. melting	28.00 to 32.00
No. 1 bundles	30.00 to 34.00
No. 2 bundles	28.00 to 32.00
No. 3 bundles	.... 25.00
Machine shop turn.	16.00 to 18.00
Elec. fur. 1 ft and under	40.00 to 42.50
No. 1 RR. hvy. melting	30.00 to 46.00
Scrap rails random lgth.	30.00 to 46.00
No. 1 cupola cast.	43.00 to 46.00

Los Angeles

No. 1 hvy. melting	$30.00 to $34.00
No. 2 hvy. melting	28.00 to 32.00
No. 1 bundles	30.00 to 34.00
No 2 bundles	28.00 to 32.00
No. 3 bundles	.... 25.00
Mach. shop turn.	16.00 to 18.00
Elec. fur. 1 ft and under	40.00 to 42.50
No. 1 RR. hvy. melting	30.00 to 46.00
Scrap rails random lgth.	30.00 to 46.00
No. 1 cupola cast.	43.00 to 46.00

Seattle

No. 1 hvy. melting	.. $35.00
No. 2 hvy. melting	.. 33.00
No. 1 bundles	.... 32.00
No. 2 bundles	.... 32.00
No. 3 bundles	.... 18.00
Elec. fur. 1 ft and under	$40.00 to 45.00
RR. hvy. melting	.... 29.00
No. 1 cupola cast	.... 45.00

Hamilton, Ont.

No. 1 hvy. melting	.... $30.00
No. 1 bundles	.... 30.00
No. 2 bundles	.... 29.50
Mechanical bundles	.... 28.00
Mixed steel scrap	.... 26.00
Mixed bor. and turn.	.... 23.00
Rails, remelting	.... 30.00
Rails, rerolling	.... 33.00
Bushelings	.... 24.50
Bush., new fact. prep'd.	.... 29.00
Bush., new fact, unprep'd.	.... 22.00
Short steel turnings	.... 23.00
Cast scrap	.... 45.00

Comparison of Prices

Steel prices in this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Jan. 23, 1951	Jan. 16, 1951	Dec. 26, 1950	Jan. 24 1950
Hot-rolled sheets	3.60	3.60	3.60	3.35
Cold-rolled sheets	4.35	4.35	4.35	4.10
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.40
Hot-rolled strip	3.50	3.50	3.50	3.25
Cold-rolled strip	4.75	4.75	4.75	4.21
Plate	3.70	3.70	3.70	3.50
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R-strip (No. 302)	36.50	36.50	36.50	33.00
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes.	$7.50	$7.50	$7.50	$7.50
Tinplate, electro (0.50 lb)	6.60	6.60	6.60	6.60
Special coated mfg. ternes	6.35	6.35	6.35	6.50
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.70	3.70	3.45
Cold finished bars	4.55	4.55	4.55	3.995
Alloy bars	4.30	4.30	4.30	3.95
Structural shapes	3.65	3.65	3.65	3.40
Stainless bars (No. 302).	31.25	31.25	31.25	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.85	4.85	4.85	4.50
Rails: (dollars per 100 lb)				
Heavy rails	$3.60	$3.60	$3.60	$3.40
Light rails	4.00	4.00	4.00	3.75
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$56.00	$56.00	$54.00
Slabs, rerolling	56.00	56.00	56.00	54.00
Forging billets	66.00	66.00	66.00	63.00
Alloy blooms billets, slabs	70.00	70.00	70.00	66.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.10	4.10	4.10	3.85
Skelp	3.35	3.35	3.35	3.15

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*

Pig Iron: (per gross ton)	Jan. 23, 1951	Jan. 16, 1951	Dec. 26, 1950	Jan. 24 1950
No. 2 foundry, del'd Phila.	$57.77	$57.77	$57.77	$50.42
No. 2, Valley furnace	52.50	52.50	52.50	46.50
No. 2, Southern Cin'ti	55.58	55.58	55.58	47.08
No. 2, Birmingham	48.88	48.88	48.88	40.38
No. 2, foundry, Chicago†	52.50	52.50	52.50	46.50
Basic del'd Philadelphia	56.92	56.92	56.92	49.92
Basic, Valley furnace	52.00	52.00	52.00	46.00
Malleable, Chicago†	52.50	52.50	52.50	46.50
Malleable, Valley	52.50	52.50	52.50	46.50
Charcoal, Chicago	70.56	70.56	70.56	68.56
Ferromanganese‡	186.25	186.25	181.20	173.40

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$46.13	$46.13	$46.13	$29.75
Heavy melt'g steel, Phila.	47.50	47.50*	44.50	23.00
Heavy melt'g steel, Ch'go	44.63	44.63	44.75	27.50
No. 1 hy. com. sh't, Det.	40.25	40.25	44.13	23.50
Low phos. Young'n	54.50	48.63	48.63	30.75
No. 1 cast, Pittsburgh	67.75	67.75	67.75	37.50
No. 1 cast, Philadelphia	62.50	62.50	62.50	37.00
No. 1 cast, Chicago	63.00	63.00	65.00	38.50
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$14.00
Foundry coke, prompt	17.25	17.25	17.25	15.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	18.50
Copper, Lake, Conn.	24.625	24.625	24.625	18.625
Tin Straits, New York	$1.77†	$1.75*	1.55	75.50
Zinc, East St. Louis	17.50	17.50	17.50	9.75
Lead, St. Louis	16.80	16.80	16.80	11.80
Aluminum, virgin	19.00	19.00	19.00	17.00
Nickel, electrolytic	53.55	53.55	53.55	42.97
Magnesium, ingot	24.50	24.50	24.50	20.50
Antimony, Laredo, Tex.	42.00	32.00	32.00	28.75

†Tentative. *Revised.

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 130 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
Jan. 23, 1951	4.131¢ per lb.	$52.69 per gross ton	$46.08 per gross ton
One week ago	4.131¢ per lb.	52.69 per gross ton	46.08 per gross ton
One month ago	4.131¢ per lb.	52.69 per gross ton	45.13 per gross ton
One year ago	3.837¢ per lb.	46.05 per gross ton	26.75 per gross ton

	High	Low
1951	4.131¢ Jan. 2	4.131¢ Jan. 2
1950	4.131¢ Dec. 1	3.837¢ Jan. 3
1949	3.837¢ Dec. 27	3.3705¢ May 3
1948	3.721¢ July 27	3.193¢ Jan. 1
1947	3.193¢ July 29	2.848¢ Jan. 1
1946	2.848¢ Dec. 31	2.464¢ Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1
1944	2.396¢	2.396¢
1943	2.396¢	2.396¢
1942	2.396¢	2.396¢
1941	2.396¢	2.396¢
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939	2.35367¢ Jan. 3	2.26689¢ May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10
1932	1.89196¢ July 5	1.83910¢ Mar. 1
1929	2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 26, 1941, issue and in May 12, 1949.

Pig Iron High	Pig Iron Low
$52.69 Jan. 2	$52.69 Dec. 12
52.69 Dec. 12	45.88 Jan. 3
46.87 Jan. 18	45.88 Sept. 6
46.91 Oct. 12	39.58 Jan. 6
37.98 Dec. 30	30.14 Jan. 7
30.14 Dec. 10	25.37 Jan. 1
25.37 Oct. 23	23.61 Jan. 2
$23.61	$23.61
23.61	23.61
23.61	23.61
$23.61 Mar. 20	$23.45 Jan. 2
23.45 Dec. 23	22.61 Jan. 2
22.61 Sept. 19	20.61 Sept. 12
23.25 June 21	19.61 July 6
32.25 Mar. 9	20.25 Feb. 16
19.74 Nov. 24	18.73 Aug. 11
14.81 Jan. 5	13.56 Dec. 6
18.71 May 14	18.21 Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Scrap Steel High	Scrap Steel Low
$46.08 Jan. 16	$45.09 Jan. 2
45.13 Dec. 19	26.25 Jan. 3
43.00 Jan. 4	19.33 June 28
43.16 July 27	39.75 Mar. 9
42.58 Oct. 28	29.50 May 20
31.17 Dec. 24	19.17 Jan. 1
19.17 Jan. 2	18.92 May 22
19.17 Jan. 11	15.76 Oct. 24
$19.17	$19.17
19.17	19.17
$22.00 Jan. 7	$19.17 Apr. 10
21.83 Dec. 30	16.04 Apr. 9
22.50 Oct. 3	14.08 May 16
15.00 Nov. 22	11.00 June 7
21.92 Mar. 30	12.67 June 9
17.75 Dec. 21	12.67 June 8
8.50 Jan. 12	6.43 July 5
17.58 Jan. 29	14.08 Dec. 8

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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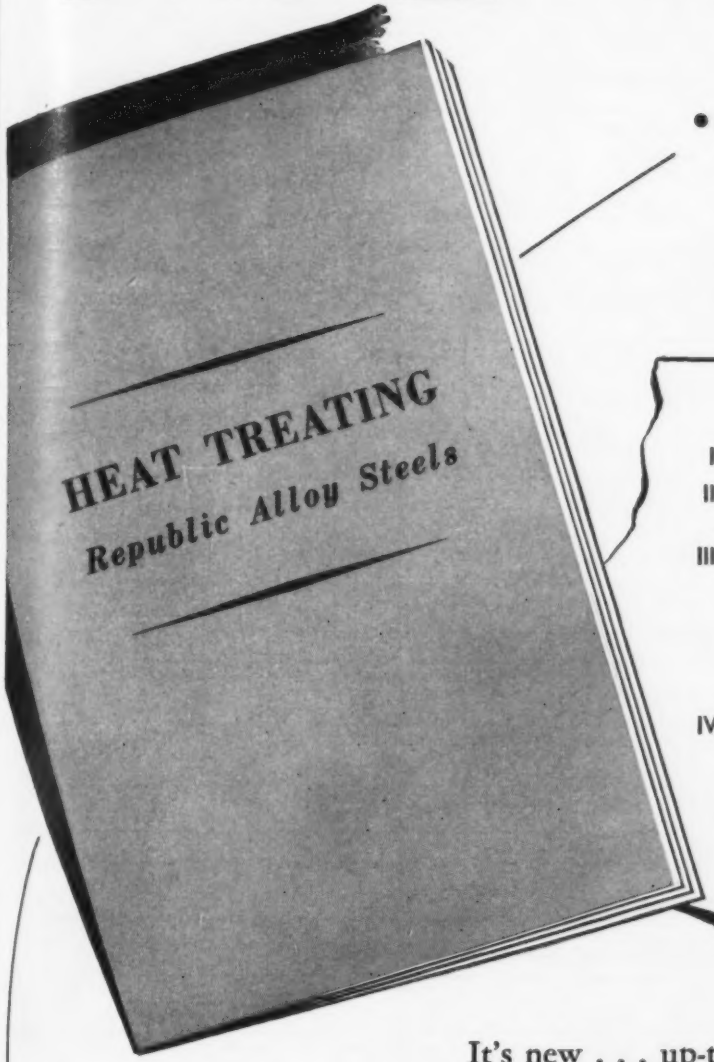

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IRON AGE

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$52.00[1]													
Alloy, net ton	$54.00[1,17]													$54.00[21]
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$56.00[1,6]	$56.00[1]	$56.00[1]						$56.00[3]		$56.00[3]			
Carbon forging billets, net ton	$66.00[1,6]	$66.00[1,4]	$66.00[1]	$66.00[4]	$66.00[4]				$66.00[3,4]	$73.00[3,6]	$66.00[3]			$69.00[21]
Alloy, net ton	$70.00[1,17]	$70.00[1,4]	$70.00[1]		$70.00[4]			$70.00[3]	$70.00[3,4]	$77.00[3,6]	$70.00[3]			$73.00[21]
PIPE SKELP	3.35[1] 3.45[6]						3.35[1,4]							
WIRE RODS	4.10[3] 4.30[18]	4.10[3,4,33]	4.10[6]	4.10[3]			4.10[6]				4.10[3]	4.20[3]		
SHEETS Hot-rolled (18 ga. & hvr.)	3.60[1,6,9,15] 3.75[38]	3.60[6,33]	3.60[1,6,8]	3.60[4]		3.60[7]	3.60[1,4,6] 4.00[13]		3.60[3]	4.00[36]		3.80[3]		3.80[13] 4.40[47]
Cold-rolled	4.35[1,6,9,15] 5.35[63]		4.35[1,6,8]	4.35[4]		4.35[7]	4.35[4,6]		4.35[3]			4.35[3]		4.55[13]
Galvanized (10 gage)	4.80[1,9,15]		4.80[1,8]		4.80[4]	4.80[7]	6.00[64]					4.80[3]		
Enameling (12 gage)	4.65[1]		4.65[1,8]			4.65[7]								
Long ternes (10 gage)	5.20[9,15]						6.00[64]							
HI str. low alloy, h.r.	5.40[1,6] 5.75[9]	5.40[1]	5.40[1,8] 5.90[6]	5.40[4]			5.40[1,4,13]		5.40[3]	5.65[36]		5.40[3]		
HI str. low alloy, c.r.	6.55[1,6] 6.90[9]		6.55[1,8] 7.05[9]	6.55[4]			6.55[4]		6.55[3]			6.55[3]		
HI str. low alloy, galv.	7.20[1]													
STRIP Hot-rolled	3.60[9], 4.00[41,58] 3.75[38] 3.50[4]	3.50[46]	3.50[1,6,8]			3.50[7]	3.50[1,4,6] 4.00[13]		3.50[3,4]	3.90[36]		3.50[3]		4.40[47]
Cold-rolled	4.65[4,9] 5.00[38] 5.35[63,65]	4.90[6,46]	4.90[6]	4.65[3]		4.65[7]	4.65[4,6] 5.35[13,40]		4.65[3]			4.65[3]		5.45[47] 5.60[66] 5.60[21]
HI str. low alloy, h.r.	5.75[9]		5.50[1] 5.30[6] 5.80[6]				4.95[4], 5.50[1] 5.40[13]			5.55[36]				
HI str. low alloy, c.r.	7.20[9]			6.70[4]			6.20[4], 6.55[13]							
TINPLATE† Cokes, 1.50-lb base box 1.25 lb, deduct 25¢	$8.70[1,9,15]		$8.70[1,6]				$8.70[4]					8.80[3]		
Electrolytic 0.25, 0.50, 0.75 lb box	Deduct $1.55, $1.30 and 90¢ respectively from 1.50-lb coke base box price													
BLACKPLATE, 29 gage Hollowware enameling	5.85[1] 6.15[15]		5.85[1]				5.30[4]							
BARS Carbon steel	3.70[1,6] 3.85[9]	3.70[1,4,33]	3.70[1,4,6,8]	3.70[4]	3.70[4]		3.70[1,4,6]		3.70[3,4]		3.70[3]			3.85[21]
Reinforcing‡	3.70[1,6]	3.70[4]	3.70[1,6,8]	3.70[4]			3.70[1,4]		3.70[3,4]		3.70[3]	3.70[3]		
Cold-finished	4.55[3,4,6,69,71]	4.55[3,69,70,73,75]	4.55[4,73]	4.55[3]	4.55[4,63]									4.70[64]
Alloy, hot-rolled	4.30[1,17]	4.30[1,4,33]	4.30[1,6,8]		4.30[4]		4.30[1,6]	4.30[3]	4.30[3,4]		4.30[3]			4.45[21]
Alloy, cold-drawn	5.40[17,52,69,71]	5.40[4,33,69,73,75]	5.40[4] 5.90[74]		5.40[4,63]			5.40[3]	5.40[3]					5.55[64]
HI str. low alloy, h.r.	5.55[1,6]		5.55[1,6] 6.05[6]	5.55[4]			5.55[1]	5.55[3]	5.55[3]		5.55[3]			
PLATE Carbon steel	3.70[1,6,15]	3.70[1]	3.70[1,6,8]	3.70[4] 4.00[9]			3.70[1,4] 3.95[13]		3.70[3]	4.15[36]	3.70[3]	3.70[3]		
Floor plates			4.75[6]	4.75[5]						4.75[36]				
Alloy	4.75[1] 4.85	4.75[1]	4.75[1]				5.20[13]			5.05[36]	4.75[3]	4.75[3]		
HI str. low alloy	5.65[1,6]	5.65[1]	5.65[1,6]	5.65[4,6]			5.65[4] 5.70[13]			5.90[36]	5.65[3]	5.65[3]		
SHAPES, Structural	3.65[1,6] 3.90[9]	3.65[1,33]	3.65[1,6]					3.70[3]	3.70[3]		3.70[3]			
HI str. low alloy	5.50[1,6]	5.50[1]	5.50[1,6]					5.50[3]	5.50[3]		5.50[3]			
MANUFACTURERS' WIRE Bright	4.85[3,6] 5.10[18]	4.85[3] 4.55		4.85[3]				Kokomo—5.80[39]			4.85[3]	4.95[3]	Duluth—4.85[3]	
PILING, Steel Sheet	4.45[1]	4.45[1]	4.45[6]						4.45[3]					

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

IRON AGE

STEEL PRICES

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
			F=$79.00[19]		INGOTS carbon forging, net ton
	$82.00[83]		F=$80.00[19]		Alloy, net ton
		$56.00[11]	F=$75.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$74.00[83]	$68.00[11]	F=$85.00[19] SF, LA, S=$85.00[83]		Carbon forging billets, net ton
	$78.00[83]		F=$89.00[19] LA=$90.00[83]		Alloy net ton
					PIPE SKELP
	4.50[83]	4.10[4,11]	SF=4.90[3] LA=4.90[34,63]	Worcester=4.40[3] Minnequa=4.35[14]	WIRE RODS
		3.60[4,11]	SF, LA=4.30[34] F=4.55[19]	Niles=5.25[54], Geneva=3.70[16]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.35[11]	SF=5.30[34] F=5.30[19]		Cold-rolled
		4.80[4, 11]	SF, LA=5.55[34]	Ashland=4.80[7]	Galvanized (10 gage)
					Enameling (12 gage)
					Long ternes (10 gage)
		5.40[11]	F=6.35[19]		Hi str. low alloy, h.r.
			F=7.50[19]		Hi str. low alloy, c.r.
					Hi str. low alloy, galv.
4.10[83]	4.90[83]	3.50[4]	SF, LA=4.25[34,63] F=4.75[19], S=4.50[83]	Atlanta=4.05[88] Minnequa=4.55[14]	STRIP Hot-rolled
			F=6.30[19] LA=6.40[27]	New Haven=5.15[3], 5.85[88]	Cold-rolled
		5.30[11]	F=6.20[19]		Hi str. low alloy, h.r.
					Hi str. low alloy, c.r.
					TINPLATE Cokes, 1.50-lb base box 1.25 lb. deduct 20¢
Deduct $1.55, $1.30 and 90¢ respectively from 1.50-lb coke base box price					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
4.10[83]	4.10[83]	3.70[4, 11]	SF, LA=4.40[34]	Atlanta=4.25[88] Minnequa=4.15[14]	BARS Carbon steel
4.10[83]	4.10[83]	3.70[4, 11]	SF, S=4.45[83] F=4.40[19] LA=4.40[83]	Atlanta=4.25[88] Minnequa=4.50[14]	Reinforcing‡
				Newark=5.00[69] Putnam=5.10[69] Hartford=5.10[4] Los Angeles=6.00[4]	Cold-finished
4.90[83]	4.70[83]		LA=5.35[83] F=5.35[19]		Alloy, hot-rolled
				Newark=5.75[69] Worcester= [3] Hartford=5.85[4]	Alloy, cold-drawn
		5.55[11]	F=6.60[19]		Hi str. low alloy, h.r.
	4.10[83]	3.70[4, 11]	F=4.30[19] S=4.60[83] Geneva=3.70[16]	Claymont=4.15[29] Coatesville=4.15[31] Minnequa=4.50[14]	PLATE Carbon steel
				Harrisburg=5.25[38]	Floor plates
			F=5.70[19] Geneva=5.85[16]	Coatesville=5.25[31] Claymont=4.85[29]	Alloy
		5.65[11]	F=6.25[19]		Hi str. low alloy
4.25[83]	4.05[83]	3.85[4, 11]	SF=4.20[83] F=4.25[19] LA=4.25[34,63] S=4.30[83]	Geneva 3.85[16] Minnequa 4.10[14]	SHAPES, Structural
		80[11]	F=6.10[19]		Hi str. low-alloy
5.65[83]	5.25[83]	4.85[4, 11]	SF, LA=5.80[34]	Atlanta=5.10[88] Worcester=5.15[3] Minnequa=5.10[14]	MANUFACTURERS' WIRE Bright

KEY TO STEEL PRODUCERS

1 U. S. Steel Co., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Steel Corp., Oakland, Calif.
20 Portsmouth Div., Detroit Steel Corp., Detroit
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill
23 Wisconsin Steel Co., South Chicago, Ill
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calif. Cold Rolled Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Worth Steel Co., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Steel & Wire Co., Harrisburg, Pa
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J
46 Simonds Saw & Steel Co., Fitchburg, Mass
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling St. & Carbide Corp., McKeesport
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa
57 Fitzsimmons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Fran.
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wyckoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit
85 Wickwire Spencer Steel, Buffalo
86 Angell Nail and Chaplet, Cleveland
87 Mid-States Steel & Wire, Crawfordsville, Ind
88 National Supply, Pittsburgh, Pa.
89 Wheatland Tube Co., Wheatland, Pa.
90 Mercer Tube & Mfg. Co., Sharon, Pa
91 Woodward Iron Co., Woodward, Ala.
92 Sloss-Sheffield Steel & Iron Co., Birmingham
93 Hanna Furnace Corp., Detroit
94 Interlake Iron Corp., Cleveland
95 Lone Star Steel Co., Dallas
96 Mystic Iron Works, Everett, Mass.
97 Jackson Iron & Steel Co., Jackson, O.
98 Globe Iron Co., Jackson, O.
99 Pittsburgh Coke & Chemical Co., Pittsburgh
100 Shenango Furnace Co., Pittsburgh
101 Tennessee Products & Chemical Corp., Nashville
102 Koppers Co., Inc., Granite City, Ill.

STAINLESS STEELS

Base price, cents per lb, f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	14.25	15.00	16.50	16.00	24.25	19.75	21.50	12.75	14.75	13.00
Slabs, billets rerolling	18.50	19.75	21.75	20.75	31.75	26.00	28.25	16.50	20.00	16.75
Forg. discs, die blocks, rings	34.00	34.00	36.50	35.50	52.50	40.00	44.50	28.00	28.50	28.50
Billets, forging	26.25	26.25	28.25	27.50	41.00	31.00	34.75	21.50	22.00	22.00
Bars, wires, structurals	31.25	31.25	33.75	32.75	48.75	36.75	41.25	25.75	26.25	26.25
Plates	33.00	33.00	35.00	35.00	51.50	40.50	45.00	27.00	27.50	27.50
Sheets	41.00	41.00	43.00	43.00	56.50	49.00	53.50	36.50	37.00	39.00
Strip, hot-rolled	26.50	28.00	32.25	30.00	48.25	36.75	41.00	23.50	30.25	24.00
Strip, cold-rolled	34.00	36.50	40.00	38.50	58.50	46.00	52.00	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38 (type 316 add 5¢), 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 46.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38 (type 316 add 5¢); W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, Pa., 13; Butler, Pa., 7.

Bars: Baltimore, 7; Duquesne, Pa. 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.

Plates: Brackenridge, Pa., 28 (type 416 add ½¢); Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer-1	3.60	4.00	4.70					
Chicago-4				6.15				
Ensley-11	3.60	4.00						
Fairfield-11		4.00	4.40			6.60	4.50	
Gary-1	3.60	4.00					4.50	
Ind. Harbor-8	3.60		4.70	6.15	5.25	8.60	4.50	
Johnstown-3		4.00			5.60	8.60		
Joliet-1		4.00	4.70					
Kansas City-83				6.40				
Lackawanna-3	3.60	4.00	4.70			8.60	4.50	
Lebanon-3				6.15				9.00
Minnequa-14	3.60	4.50	4.70	6.15		8.60	4.50	9.00
Pittsburgh-77						9.35		9.00
Pittsburgh-78								9.00
Pittsburgh-5				6.15				
Pittsburg-24							4.65	
Seattle-62				6.10			4.35	
Steelton-3	3.60		4.70				4.50	
Struthers-6				6.15				
Torrance-24							4.65	
Youngstown-4				6.15				

Track Bolts, heat treated, to railroads, 9.85¢ per lb.

BOILER TUBES

Seamless steel, electric welded commercial boiler tubes, locomotive tubes, minimum wall, per 100 ft at mill, o.l. lots, cut lengths 10 to 24 ft.

OD gage in in.	BWG	Seamless H.R.	Seamless C.D.	Electric Weld H.R.	Electric Weld C.D.
2	13	$22.67	$26.66	$21.99	$25.86
2½	12	30.48	35.84	29.57	34.76
3	12	33.90	39.90	32.89	38.69
3½	11	42.37	49.89	41.10	48.39
4	10	52.60	61.88	51.03	60.03

Pittsburgh Steel add, H-R: 2 in., 62¢; 2½ in., 84¢; 3 in., 92¢; 3½ in., $1.17; 4 in., $1.45. Add, C-R: 2 in., 74¢; 2½ in., 99¢; 3 in., $1.10; 3½ in., $1.37; 4 in., $1.70.

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill. Base price, per ton net: Effective CaF, content:

70% or more	$43.00
60% or less	40.00

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Base Col.	Woven Wire Fence 9-15½ ga. Base Col.	Fence Posts Base Col.	Single Loop Bale Ties Base Col.	Twisted Barbless Wire Base Col.	Galv. Barbed Wire Base Col.	Merch. Wire Ann'ld. ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City-4	118	126	....	123	....	136	5.70	5.95
Aliquippa, Pa.-5	118	132	....	....	136	140	5.70	6.15
Atlanta-65	113	133	....	126	126	143	5.95	6.40
Bartonville-34	118	130	140	123	143	143	5.95	6.15
Buffalo-85	....	....	....	....	....	....	....	....
Cleveland-86	....	....	....	....	....	....	....	....
Cleveland-2	....	....	....	....	....	....	5.70	6.15
Crawfordsville-87	....	132	....	....	....	145	5.95	6.40
Donora, Pa.-2	118	130	....	123	....	140	5.70	6.15
Duluth-2	118	130	....	123	....	140	5.70	6.15
Fairfield, Ala.-11	118	130	....	123	....	136	5.70	6.15
Houston-83	128	138	....	....	....	148	6.10	6.55
Johnstown, Pa.-3	118	130	....	....	140	....	5.70	6.15
Joliet, Ill.-2	118	130	....	123	....	140	5.70	6.15
Kokomo, Ind.-30	120	132	....	125	138	138	5.80	6.05
Los Angeles-62	....	....	....	....	....	....	6.65	....
Kansas City-83	130	130	142	135	....	152	6.30	6.75
Minnequa-14	123	138	130	128	146	146	5.95	6.45
Monessen-18	124	135	....	....	....	145	5.95	6.40
Moline, Ill.-4	....	....	136	....	....	....	....	....
Palmer-85	....	....	....	....	....	....	....	....
Pittsburg, Cal.-24	137	149	....	147	158	160	6.65	6.80
Portsmouth-20	124	137	....	....	147	147	6.10	6.60
Rankin, Pa.-2	118	130	....	....	....	140	5.70	6.15
So. Chicago, Ill.-4	118	126	140	123	....	136	5.70	5.95
S. San Fran.-14	....	....	....	147	....	160	6.65	7.10
Sparrows Pt.-3	120	....	....	125	142	142	5.80	6.25
Sterling, Ill.-33	118	130	140	123	140	140	5.70	6.15
Struthers, Ohio-6	....	....	....	....	....	....	5.70	6.15
Torrance, Cal.-24	138	....	....	....	....	....	6.65	....
Worcester-2	124	....	....	....	....	....	6.00	6.45
Williamsport, Pa.-51	....	....	150	....	....	....	....	....

Cut Nails, carloads, base, $6.75 per 100 lb. (less 20¢ to jobbers) at Conshohocken, Pa., (26), Wareham, Mass. (53) Wheeling, W. Va., (15).

CAST IRON WATER PIPE

Per net ton

6 to 24-in., del'd Chicago $105.30 to $108.80
6 to 24-in., del'd N. Y. 104.50 to 105.50
6 to 24-in., Birmingham 91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less $108.50 to $113.00
Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

PIPE AND TUBING

Base discounts, f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD ½ in. Blk.	½ in. Gal.	¾ in. Blk.	¾ in. Gal.	1 in. Blk.	1 in. Gal.	1¼ in. Blk.	1¼ in. Gal.	1½ in. Blk.	1½ in. Gal.	2 in. Blk.	2 in. Gal.	2½-3 in. Blk.	2½-3 in. Gal.	SEAMLESS 2 in. Blk.	2 in. Gal.	2½-3 in. Blk.	2½-3 in. Gal.	3½-4 in. Blk.	3½-4 in. Gal.
STANDARD T. & C.																				
Sparrows Pt.-3	34.0	12.0	37.0	16.0	39.5	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0	....	....	....	....	....	....
Cleveland-4	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	....
Oakland-19	25.0	3.0	28.0	7.0	30.5	10.5	31.0	21.0	31.5	22.0	32.0	12.5	32.5	13.0	....	....	....	....	....	....
Pittsburgh-5	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5	11.5	34.5	13.5
Pittsburgh-10	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
St. Louis-32	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0	....	....	....	....	....	....
Sharon-90	36.0	13.0	39.0	17.0	41.5	20.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0	....	....	....	....	....	....
Toledo-88	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	....	32.5	....	34.5	....
Wheeling-15	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	....
Wheatland-89	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	....	....	....	....	....	....
Youngstown-6	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
EXTRA STRONG, PLAIN ENDS																				
Sparrows Pt.-3	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0	....	....	....	....	....	....
Cleveland-4	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	....
Oakland-19	24.5	4.0	28.5	16.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0	....	....	....	....	....	....
Pittsburgh-5	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0	36.0	15.5
Pittsburgh-10	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5
St. Louis-32	34.5	14.0	38.5	18.0	40.5	21.5	41.0	22.0	41.5	23.0	42.0	23.5	42.5	24.0	....	....	....	....	....	....
Sharon-90	35.5	14.0	39.5	18.0	41.5	21.0	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0	....	....	....	....	....	....
Toledo-88	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	....	33.0	....	36.5	....
Wheeling-15	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	....
Wheatland-89	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	....	....	....	....	....	....
Youngstown-6	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5

Galvanized discounts based on zinc at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. Threads only, buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3½ pts. higher discount. Buttweld jobbers' discount, 5 pct.

WAREHOUSES

Base price, f.o.b., dollars per 100 lb. *(Metropolitan area delivery, add 20¢ except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul, add 15¢; Memphis, add 10¢; Philadelphia, add 25¢; New York, add 30¢).

Cities	Sheets			Strip		Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As rolled	Cold-Drawn A 4140 Annealed
Baltimore	5.60	6.84	7.49[2]–8.07	6.04	.....	5.80	6.14	6.04	6.84–6.89	10.24	10.54	11.89	12.19
Birmingham*	5.60	6.40	6.75	5.55	.....	5.95	5.70	5.55	.....	.....	.....	.....	.....
Boston	6.20	7.00–7.25	7.74–8.29	8.15	8.50[4]	6.48–6.78	6.20	6.05	6.79–6.84	10.25	10.55	11.90–12.00	12.20–12.30
Buffalo	5.60	6.40	7.74–8.09	5.88	.....	6.05	5.80	5.60	6.40–6.45	10.15–10.85	10.45	11.80	11.95–12.10
Chicago	5.60	6.40	7.75	5.55	.....	5.80	5.70	5.55	6.30	9.80	10.10	11.45	11.75
Cincinnati*	5.87	6.44	7.39	5.80	.....	6.19	6.09	5.80	6.61	10.15	10.45	11.80	12.10
Cleveland	5.60	6.40	8.10	5.69	6.90	5.92	5.82	5.57	6.40	9.91	10.21	11.56	11.86
Detroit	5.78	6.53	7.89	5.94	.....	5.99	6.09	5.84	6.56	10.11	10.41	11.76	12.06
Houston	7.00	8.25	.....	.....	.....	6.85	6.50	6.65	9.35	10.35	11.25	.....	12.75
Indianapolis, del'd	6.00	6.80	8.15	5.95	.....	6.20	6.10	5.95	6.80	.....	.....	.....	.....
Kansas City	6.00	6.80	7.45	6.15	7.50	6.40	6.30	6.15	7.00	10.40	10.70	12.05	12.35
Los Angeles	6.35	7.90	8.85	6.40	9.45[6]	6.40	6.35	6.35	8.20	11.30	11.30	13.20	13.50
Memphis*	6.33–6.38	7.08–7.18	.....	6.33–6.38	.....	6.43–6.02	6.33–6.48	6.08–6.33	7.16–7.32	.....	.....	.....	.....
Milwaukee	5.74	6.54	7.89	5.69–6.59	.....	5.94	5.84	5.69	6.44–6.54	9.94	10.24	11.59	11.89
New Orleans*	5.70	6.50	.....	5.75	7.25	5.95	5.75	5.75	7.30	.....	.....	.....	.....
New York*	5.67–5.97	7.19[5]–7.24[1]	8.14[2]	6.29–6.89	8.63[4]	6.28–6.58	6.10	6.12	6.99	10.05–10.15	10.35–10.45	11.70–11.80	12.10–12.20
Norfolk	6.50[3]	.....	.....	.....	.....	6.50[3]	6.60[3]	6.55[3]	.....	.....	.....	.....	.....
Philadelphia*	5.90	6.55	8.00	6.10	.....	6.05	5.90	6.05	6.61	9.90	10.20	.....	.....
Pittsburgh	5.80	6.40	7.75	5.65–5.95	.....	5.75	5.70	5.55	6.15	9.80	10.10	11.45	11.75
Portland	6.60–7.55	8.95	8.50–9.10	7.30	.....	6.80	6.95	6.90	.....	.....	12.15	.....	.....
Salt Lake City	7.95	.....	9.70	8.70	.....	8.05	8.30	8.65	9.00	.....	.....	.....	.....
San Francisco*	6.65	8.05[3]	8.55–8.90[2]	6.60	9.45[6]	6.50	6.45	6.45	8.20	11.30	11.30	13.20	13.20–13.50
Seattle	7.05	8.60	9.20	9.05	.....	6.75	6.65	6.75	9.05	.....	.....	.....	.....
St. Louis	5.80–5.85	6.65	8.00	5.80	8.00[4]–8.28	6.13	6.03	5.80	6.55–6.65	10.05	10.35	11.70	12.00
St. Paul*	6.16	6.96	8.31	6.11	.....	6.36	6.26	6.11	6.96	10.36	10.66	12.01	12.31

BASE QUANTITIES (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 400 to 1999 lb; (4) 6000 lb and over; (5) 1500 to 9999 lb.; (6) 2000 to 5999 lb.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Blast Furnace Silvery	Low Phos. Charcoal
Bethlehem-3	54.00	54.50	55.00	55.50	.....	.....	.....
Birmingham-4	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-91	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-92	48.38	48.88	.....	.....	.....	.....	.....
Buffalo-4	52.00	52.50	53.00	.....	.....	.....	.....
Buffalo-93	52.00	52.50	53.00	.....	.....	63.75	.....
Chicago-94	52.00	52.50	52.50	53.00	.....	.....	.....
Cleveland-2	52.00	52.50	52.50	53.00	57.00	.....	.....
Cleveland-4	52.00	52.50	52.50	.....	.....	.....	.....
Daingerfield, Tex.-95	48.00	48.50	48.50	.....	.....	.....	.....
Duluth-94	52.00	52.50	52.50	53.00	.....	.....	.....
Erie-94	52.00	52.50	52.50	53.00	.....	.....	.....
Everett, Mass.-96	.....	53.25	53.75	.....	.....	.....	.....
Fontana-19	58.00	58.50	.....	.....	.....	.....	.....
Geneva, Utah-16	52.00	52.50	52.50	53.00	.....	.....	.....
Granite City, Ill.-102	53.90	54.40	54.90	.....	.....	.....	.....
Hubbard, O.-6	52.00	52.50	52.50	.....	.....	.....	.....
Ironton, Utah-16	52.00	52.50	.....	.....	.....	62.50	.....
Jackson, O.-97,98	.....	.....	.....	.....	.....	.....	66.00
Lyle, Tenn.-101	.....	.....	.....	.....	.....	.....	.....
Monessen-18	54.00	.....	.....	.....	.....	.....	.....
Neville Island-99	52.00	52.50	52.50	53.00	.....	.....	.....
Pittsburgh-1	52.00	.....	.....	53.00	.....	.....	.....
Sharpsville-100	52.00	52.50	52.50	53.00	.....	.....	.....
Steelton-3	54.00	54.50	55.00	55.50	60.00	.....	.....
Swedeland-26	56.00	56.50	57.00	57.50	.....	.....	.....
Toledo-94	52.00	52.50	52.50	53.00	.....	.....	.....
Troy, N. Y.-4	54.00	54.50	55.00	.....	60.00	.....	.....
Youngstown-6	52.00	52.50	52.50	53.00	.....	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content over 0.70 pct. Silvery iron: Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

REFRACTORIES

Fire Clay Brick *(F.o.b. works) Carloads, Per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5) $94.60
No. 1 Ohio 88.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 85.00
No. 2 Ohio 79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) 13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala. $94.60
Childs, Pa. 99.00
Hays, Pa. 100.10
Chicago District 104.50
Western Utah and Calif. 111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago 111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) 16.50
Silica cement, net ton, bulk, Hays, Pa. 13.70
Silica cement, net ton, bulk, Ensley, Ala. 17.60
Silica cement, net ton, bulk, Chicago District 17.60
Silica cement, net ton, bulk, Utah and Calif. 24.75

Chrome Brick *Per Net Ton*

Standard chemically bonded, Balt., Chester $82.00

Magnesite Brick

Standard, Baltimore $104.00
Chemically bonded, Baltimore 93.00

Grain Magnesite *St. ⅝-in. grains*

Domestic, f.o.b. Baltimore, in bulk fines removed $63.70
Domestic, f.o.b. Chewelah, Wash., in bulk 36.30
in sacks 41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢.... $13.00

COKE

Furnace, beehive (f.o.b. oven) Net Ton
Connellsville, Pa. ..... $14.00 to $14.50
Foundry, beehive (f.o.b. oven)
Connellsville, Pa. ..... $17.00 to $17.50
Foundry, oven coke
Buffalo, del'd $25.35
Chicago, f.o.b. 21.00
Detroit, f.o.b. 23.00
New England, del'd 24.80
Seaboard, N. J., f.o.b. 22.00
Philadelphia, f.o.b. 22.70
Swedeland, Pa., f.o.b. 22.60
Plainesville, Ohio, f.o.b. 24.00
Erie, Pa., f.o.b. 23.50
Cleveland, del'd 25.72
Cincinnati, del'd 25.06
St. Paul, f.o.b. 21.00
St. Louis, f.o.b. 24.90
Birmingham, del'd 20.79
Neville Island, f.o.b. 23.00

LAKE SUPERIOR ORES

(51.50% *Fe; natural content, delivered lower lake ports*)

Per gross ton

Old range, bessemer $8.70
Old range, nonbessemer 8.55
Mesabi, bessemer 8.45
Mesabi, nonbessemer 8.30
High phosphorus 8.30

After adjustments for analyses, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon ..... 5.35¢
0.41 to 0.60 carbon ..... 6.30¢
0.61 to 0.80 carbon ..... 7.40¢
0.81 to 1.05 carbon ..... 9.35¢
1.06 to 1.35 carbon ..... 11.65¢

Worcester, add 0.30¢; Sharon, Carnegie, New Castle, add 0.35¢; Detroit, 0.26 to 0.40 carb., add 25¢; other grades add 15¢. New Haven, 0.26 to 0.40 carb., add 50¢; other grades add 5¢.

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices
(Base discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in.	14	27½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	....

Nuts, Hot Pressed, Cold Punched—Sq

	Pct Off List Less Keg (Reg.)	K.	Less Keg (Hvy.)	K.
½ in. & smaller	15	28½	15	28½
9/16 in. & ⅝ in.	12	25	6½	21
¾ in. to 1½ in. inclusive	9	23	1	16½
1⅝ in. & larger	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	2	17½
1⅝ in. & larger	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	12	25
1⅝ in. & larger	12	25	6½	21

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller	35	45	28½	39½
9/16 in. & ⅝ in.	29½	40½	22	34
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger	13	26	8½	23
	Light			
7/16 in. & smaller	35	45		
½ in. thru ⅝ in.	28½	39½		
¾ in. to 1½ in. inclusive	26	37		

Stove Bolts

	Pct Off List
Packaged, steel, plain finished	56—10
Packaged, plated finish	41—10
Bulk, plain finish**	67*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

	Base per 100 lb
½ in. & larger	$7.85
	Pct Off List
7/16 in. & smaller	36

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.

Cap and Set Screws

(In bulk)	Pct Off List
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	54
¾ in. thru 1 in. up to & including 6 in.	48
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	46
¾ in. thru 1 in. up to & including 6 in.	41
Milled studs	35
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.35

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2½	24, 30	23.15
2	24, 30	25.36
	CARBON	
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. (21)	*29.5	
Washgtn, Pa. (39)	*29.5	
Claymont, Del. (29)	*28.00	
Conshohocken, Pa. (26)		*24.00
New Castle, Ind. (55)	*26.50	*25.50
Nickel-carbon		
10 pct. Coatesville (21)	32.5	
Inconel-carbon		
10 pct Coatesville (21)	40.5	
Monel-carbon		
10 pct Coatesville (21)	33.5	
No. 302 Stainless-copper-stainless, Carnegie, Pa. (60)		77.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)		7.75

*Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.235
18	4	1	—	5	$1.86
18	4	2	—	—	$1.38
1.5	4	1.5	8	—	78.5¢
6	4	2	6	—	.87¢

High-carbon chromium	63.5¢
Oil hardened manganese	35¢
Special carbon	32.5¢
Extra carbon	27¢
Regular carbon	23¢

Warehouse prices on and east of Mississippi are 3¢ per lb higher. West of Mississippi, 5¢ higher.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	36.0¢ to 39.5¢
Electrolytic iron unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	70.0¢ to $1.38
Aluminum	29.00¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic	10.25¢ plus metal value
Copper, reduced	10.00¢ plus metal value
Cadmium 100-199 lb.	95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity	$3.50
Lead	6.5¢ plus metal value
Manganese	52.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	75.5¢
Nickel, annealed	81.5¢
Nickel, spherical, unannealed	78.5¢
Silicon	24.00¢
Solder powder	6.5¢ to 8.5¢ plus met. value
Stainless steel, 302	75.00¢
Tin	11.00¢ plus metal value
Tungsten, 99%	$4.15
Zinc, 10 ton lots	20.50¢ to 23.35¢

ELECTRICAL SHEETS

22 Ga. H-R cut lengths

F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech Botton-15	....	7.25	8.50	9.30	9.85	10.40	11.10
Brackenridge-28	....	7.25	8.50	9.30	9.85	....	....
Follansbee-63	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Granite City-22	....	7.95	9.20	....	....	....	....
Ind. Harbor-3	6.75	7.25	....	....	....	....	....
Mansfield-75	6.75	7.25	8.50	9.30	....	....	....
Niles, O.-64	7.05	7.55	....	....	....	....	....
Vandergrift-1	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Warren, O.-4	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Zanesville-7	6.75	7.25	8.50	9.30	9.85	10.40	11.10

Transformer 52, 80¢ above Transformer 58.

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.50	0.20% C	29.50
0.10% C	30.00	0.50% C	29.25
0.15% C	29.75	1.00% C	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			32.00
62-66% Cr, 4-6% C, 6-9% Si			32.85

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% Max. C.	$1.09
0.50% max. C.	1.05
.00 min. C	1.04

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.00¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.20¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.50

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.20
Less ton lots	23.20

CMSZ

Contract price, cents per lb of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	20.75
Less ton lots	22.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50¢
Less ton lots	17.75¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00¢
Ton lots to carload packed	19.00¢
Less ton lots	20.50¢

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ⅛ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

FERROALLOYS

Ferromanganese

78-82% Mn. maximum contract base price, gross ton, lump size.
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont., Ashtabula, O. $185
F.o.b. Johnstown, Pa. $187
F.o.b. Sheridan, Pa. $185
F.o.b. Etna, Clairton, Pa. $188
$2.00 for each 1% above 82% Mn. penalty, $2.15 for each 1% below 78%.
Briquets—Cents per pound of briquet, delivered, 66% contained Mn.
Carload, bulk 10.45
Ton lots 12.05

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$74.00	$75.00
Pgh. or Chicago	74.00	75.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.
Carload, packed 29.75
Ton lots 31.35

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.
Carloads 38
Ton lots 39
Less ton lots 43

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn .....19.15¢

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd., Mn. 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	26.25	28.10	29.30
0.07% max. C.....	25.75	27.60	28.80
0.15% max. C.....	25.25	27.10	28.30
0.30% max. C.....	24.75	26.60	27.80
0.50% max. C.....	24.25	26.10	27.30
0.75% max. C, 7.00% max. Si.....	21.25	23.10	24.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.
Carload bulk 9.90
Ton lots 11.55
Briquet, contract basis carlots, bulk delivered, per lb of briquet 11.15
Ton lots 11.75

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk Iowa, or Wenatchee, Wash., $89.50 gross ton, freight allowed to normal trade area Si 15.01 to 15.50 pct, f.o.b. Niagara Falls N. Y., $83.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.
96% Si, 2% Fe 21.70
97% Si, 1% Fe 22.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 1 lb Si briquets.
Carload, bulk 6.95
Ton lots 8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.
25% Si..... 19.00 75% Si..... 14.30
50% Si..... 12.40 85% Si..... 15.55
90-95% Si 17.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.65	$2.95	$3.75
Less ton lots..	2.40	3.30	4.55

Other Ferroalloys

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
Carload ..... 8.15¢
Ton lots ..... 9.55¢

Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo $1.18

Ferrocolumbium, 50-60%, 2 in x D, contract basis, delivered, per pound contained Cb.
Ton lots $4.90
Less ton lots 4.95

Ferro-Tantalum-columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $3.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo $1.33

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
10 tons to less carload 75.00

Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.55

Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $177.00

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered $3.25

Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.
Openhearth .....$3.00-$3.05
Crucible 3.10- 3.15
High speed steel (Primos)..... 3.25

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Carload, bulk lump ..... 14.50¢
Ton lots, bulk lump ..... 15.75¢
Less ton lots, lump ..... 16.25¢

Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.35

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Ton lots ..... $1.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
Carload, bulk ..... 7.00¢

Boron Agents

Contract prices per lb of alloy, del.
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B $5.35

Bortam, f.o.b. Niagara Falls
Ton lots, per pound ..... 45¢
Less ton lots, per pound..... 50¢

Carbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots, per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max Si, 0.50% max. Al, 0.50% max. C, 1 in x D. Ton lots $1.30
F.o.b. Wash., Pa.; 100 lb, up
10 to 14% B..... .75
14 to 19% B..... 1.30
19% min. B..... 1.85

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.
No. 1 ..... $1.00
No. 6 ..... 65¢
No. 79 ..... 50¢

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.
Ton lots $1.40
Less ton lots 1.57

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.
Less ton lots $1.30

Silcaz, contract basis, delivered.
Ton lots ..... 45.00¢

Defense Contracts to Metalworking Industry

Selected Contracts, Week of Jan. 22, 1951

Item	Quan.	Value	Company
Tanks	....	$99,000,000.00	Chrysler Corp., Detroit
Vehicles	....	76,000,000.00	Studebaker Corp., South Bend.
F-89 planes	....	.....	Northrop Aircraft, Inc., Hawthorne
Ambulances	422	1,853,115.94	Watson Auto. Equip. Co., Wash., D. C.
Axles, gears	1,800	693,154.70	Federal Motor Trk. Co., Detroit
Retainer and axles.	320	203,762.40	Ward LaFrance Trk. Co., Elmira
Engine	420	368,634.00	White Mtr. Co., Cleveland
Receiver-transmitter	....	621,741.00	Wilcox Electric Co., Inc., Kansas City
Airplanes	....	3,840,000.00	Douglas Aircraft Co., Inc., Santa Monica
Receiver-transmitter	....	1,559,237.00	Bendix Radio Div., Bendix Aviation Corp., Baltimore
Machmeters	....	338,164.00	Kollsman Instrument Div., Square D Co., Elmhurst
Automatic pilots	....	2,000,000.00	Minneapolis-Honeywell Regulator Co., Minneapolis
Microwave systems	....	1,500,000.00	Philco Corp., Philadelphia
Trainers, simulators	....	2,000,000.00	Link Aviation, Inc., Binghamton
Flight computors	....	6,105,000.00	Sperry Gyroscope Co., Great Neck
Generators	....	1,163,808.00	Jack & Heintz Precision Ind., Inc., Cleveland
Amplifiers	....	315,997.00	Rauland Borg Corp., Chicago
Machinery	....	425,000.00	Eastman Kodak Co., Rochester
Oil filter assemblies	5,800	1,603,801.00	Purolator Products, Inc., Rahway
Helicopters	10	3,137,684.00	United Aircraft Corp., Bridgeport
Deck turrets	180	4,914,000.00	The Glenn L. Martin Co., Baltimore
Stowage cabinets	55,400	755,656.00	Sterod Mfg. Co., Newark, N. J.
Pumps	89	647,634.91	Blackmer Pump Co., Grand Rapids
Diesel engines	34	3,500,000.00	Packard Motor Car Co., Detroit
Power plants	25 ea.	130,000.00	O. E. Szekely, Philadelphia
Jet engine parts...	....	5,150,000.00	Allison Div., General Motors Corp., Indianapolis
Power units	....	439,968.00	Sorensen & Co., Inc., Stamford